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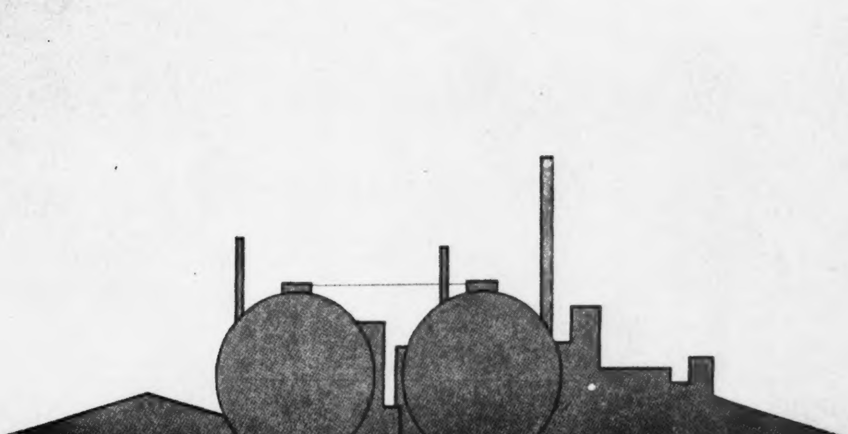
DEPARTMENT

AUGUST 1961

RUBBER WORLD

Compounding chlorobutyl with other elastomers



BULLETIN:

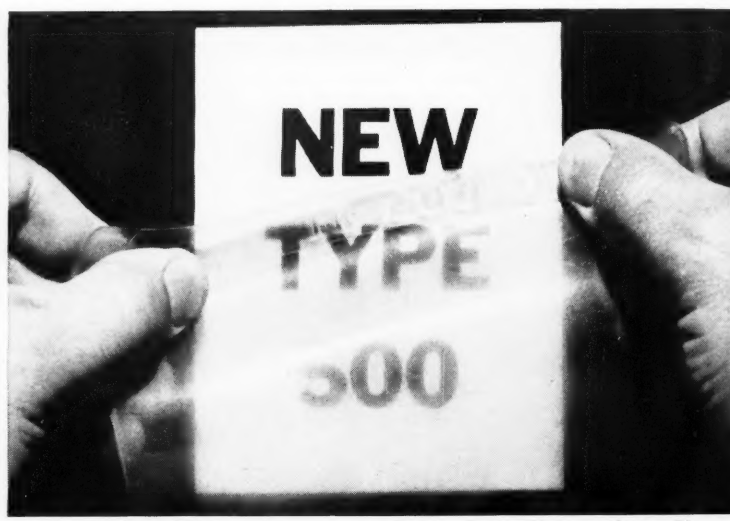
Shell announces new oil-extended Shell Isoprene Rubber 500—first type of polyisoprene at SBR prices

Shell Isoprene Rubber is the first commercially made synthetic to duplicate the molecular structure of natural rubber.

Now, Shell has developed an oil-extended form of Shell Isoprene Rubber. New Type 500.

The result is a polymer that combines the advantages of tree-grown rubber with the uniformity and economy of SBR.

This report answers nine questions about new Type 500.



A test sheet of Type 500 in a gum stock formulation. Note its clarity. Non-discoloring Type 500 is an economical choice for footwear and mechanical goods.

1. Is the polymer in Type 500 the same as in regular Shell Isoprene Rubber Type 305? No. The polymer in Type 500 is made to a higher molecular weight. Type 500 also contains 25 parts of nonstaining naphthenic oil to 100 parts rubber.

2. What color is it? Very light colored. Both the oil and antioxidant are selected to permit Type 500's use in products where light color is essential.

3. Is it compatible with other elastomers? Yes. New Shell Isoprene Rubber Type 500 can be blended in any proportion with natural rubber, SBR, Neoprene, nitriles and many others.

4. How should Type 500 be formulated? Use less accelerator than with regular Shell Isoprene Rubber (Type 305) or natural rubber; otherwise compounding is identical.

5. Can it be processed in conventional equipment? Yes. Its processing characteristics and vulcanization techniques are similar to those of Shell Isoprene Rubber Type 305 and natural rubber.

NOTE: New Type 500 withstands extended processing better than either polyisoprene or Hevea.

6. What can it be used for? It was primarily designed for mechanical goods, footwear and carcass stocks. Experimentation will undoubtedly yield other applications.

7. What does it cost? It now sells for 21.5¢ per pound, f.o.b. Torrance, California. Or 22.6¢ per pound carloads or truckloads delivered buyer's works.

8. Where can you get it? From any Shell Synthetic Rubber sales office. Their locations are: 500 Summer St., Stamford, Conn., (DA 5-1581); 20575 Center Ridge Road, Cleveland 16, Ohio, (ED 3-0600) and 5230 Clark St., Lakewood, Calif., (SP 3-4997).

NOTE: Mixed loads of Shell Isoprene Rubber Type 500 and other Shell polymers can be ordered at applicable carload prices.

9. How can I get samples and technical information? Contact one of the three Shell sales offices listed. Or write: Shell Chemical Company, P. O. Box 216, Torrance, California.

A Bulletin from

Shell Chemical Company

SHELL

Synthetic Rubber Division

RUBBER WORLD, August, 1961, Vol. 144, No. 5. Published monthly by BILL BROTHERS PUBLISHING CORP. Office of Publication, 3rd & Hunting Park Ave., Philadelphia 40, Pa., with Editorial and Executive Offices at 630 Third Avenue, New York 17, N. Y., U.S.A. Second Class Postage Paid at Philadelphia, Pa., under the act of March 3, 1879. Subscription United States $5.00 per year; Canada $6.00; all other countries $10.00. Single Copies 50¢ in U.S.; $1.00 elsewhere. Address Mail to N. Y. Office. Copyright August, 1961, by BILL BROTHERS PUBLISHING CORP.

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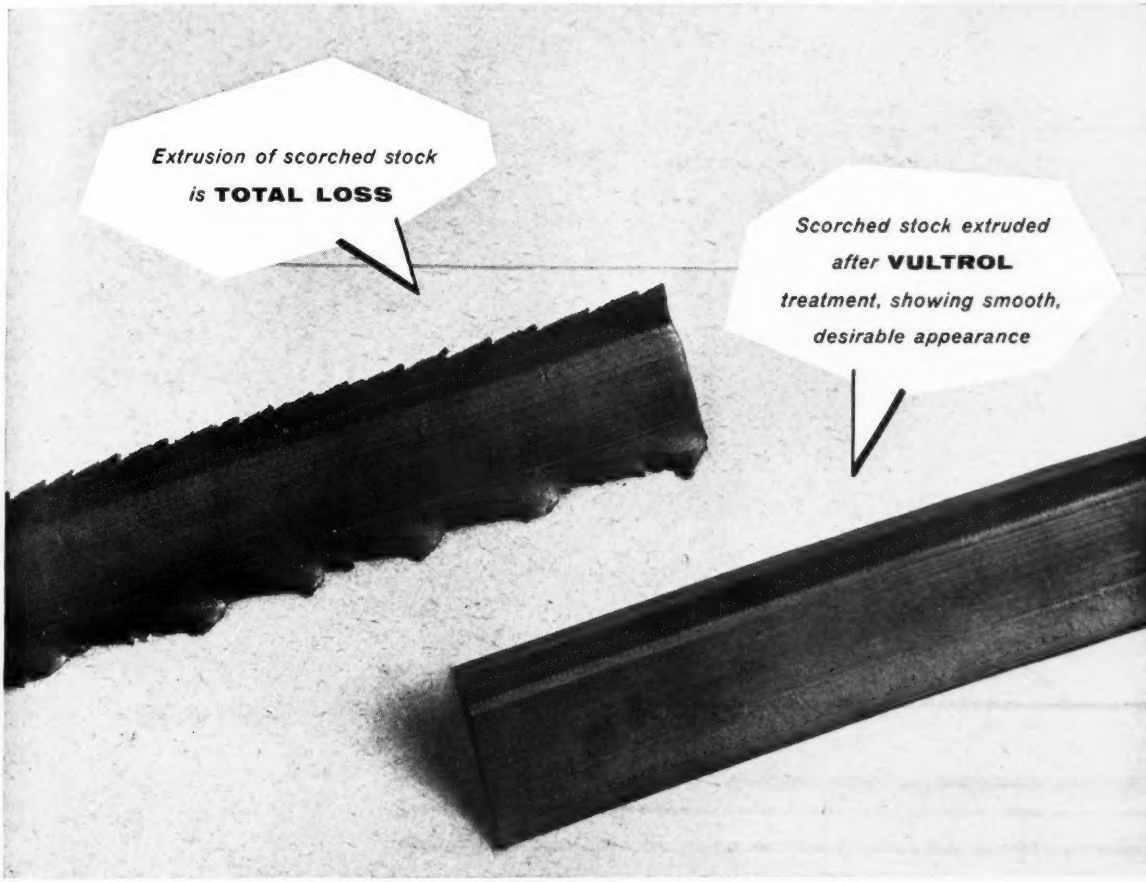

Recover scorched stock for extra profits

with Good-rite Vultrol

You can convert slightly scorched stock from a loss into profit by using Good-rite Vultrol to treat it. As the samples above show, Vultrol makes possible remarkable recovery. The Vultrol-treated sample extrudes with the same desirable appearance of unscorched stock.

Even if stock is not scorched, it pays to use Vultrol to counteract higher summer processing temperatures. You speed up extrusion rates, maintain appearance and reduce operating hours of expensive equipment.

Good-rite Vultrol is beneficial in the processing of high-loaded or highly accelerated compounds, too. For tire tread compounds it is particularly effective with high-abrasion furnace blacks.

Supplied as a free-flowing flake, Good-rite Vultrol will pay you dividends in preventing scorch or recovering scorched stocks. For more information, write Department MD-6, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. In Canada: Kitchener, Ontario.

Good-rite CHEMICALS

B.F.Goodrich Chemical

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RUBBER WORLD

VOLUME 144 NUMBER 5 AUGUST, 1961

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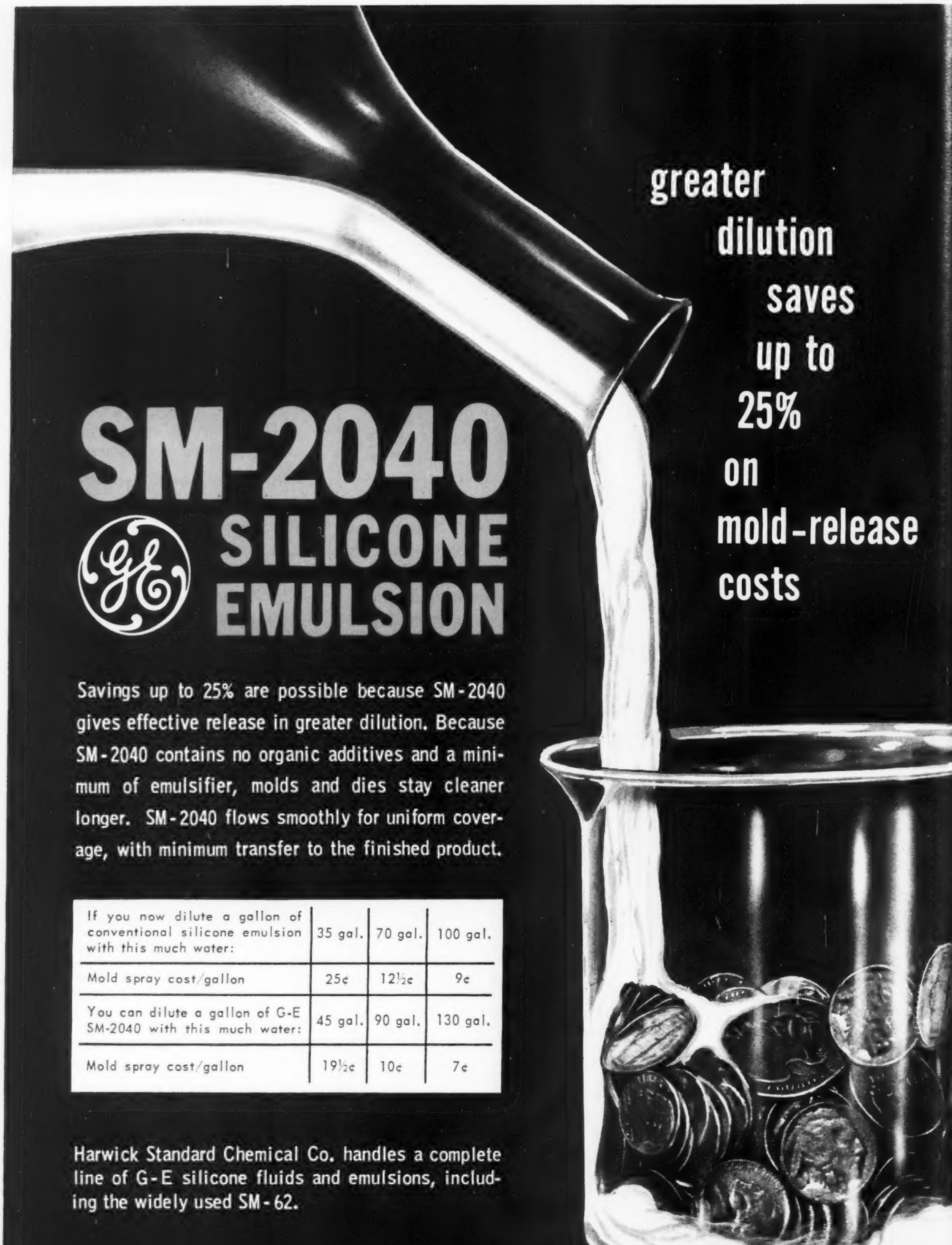

SM-2040 SILICONE EMULSION

Savings up to 25% are possible because SM-2040 gives effective release in greater dilution. Because SM-2040 contains no organic additives and a minimum of emulsifier, molds and dies stay cleaner longer. SM-2040 flows smoothly for uniform coverage, with minimum transfer to the finished product.

If you now dilute a gallon of conventional silicone emulsion with this much water:	35 gal.	70 gal.	100 gal.
Mold spray cost/gallon	25¢	12½¢	9¢
You can dilute a gallon of G-E SM-2040 with this much water:	45 gal.	90 gal.	130 gal.
Mold spray cost/gallon	19½¢	10¢	7¢

Harwick Standard Chemical Co. handles a complete line of G-E silicone fluids and emulsions, including the widely used SM-62.

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news of the rubber world

August, 1961

"International Picture" is the new heading starting this month for the section of RUBBER WORLD formerly called "News From Abroad." The large number of United States companies who have subsidiaries or cooperative ventures overseas plus a growing list of foreign concerns having similar arrangements in the U. S. makes it very difficult to draw a line between domestic and worldwide news. The scope of our new section has thus been widened to include all news of international importance. This revised section (see page 105) is another step in our series of changes designed to serve you better and to save your valuable reading time.

The Annual Meeting of the American Society for Testing Materials which was held in Atlantic City in June saw the usual group of very dedicated and hard-working men getting together to maintain order and prevent chaos in testing and related problems. Two of these men who have devoted much of their time and energy to the success of Committee D-11 on rubber are Simon Collier, chairman, and John J. Allen, secretary. ASTM recognized their efforts by granting Collier an Honorary Membership in ASTM and by presenting Allen with the ASTM Award of Merit. (See page 82.)

The ISO's Technical Committee 45 on rubber, with interests similar to those of D-11, gave added weight to this type of work when it announced that in the future, meetings of ISO/TC 45 would be held yearly rather than every other year in order to speed up the Committee's actions. The U. S. delegation to this year's meeting in Milan, Italy, in May had a fine reception and foresees much international progress in the years ahead.

(Continued on next page)

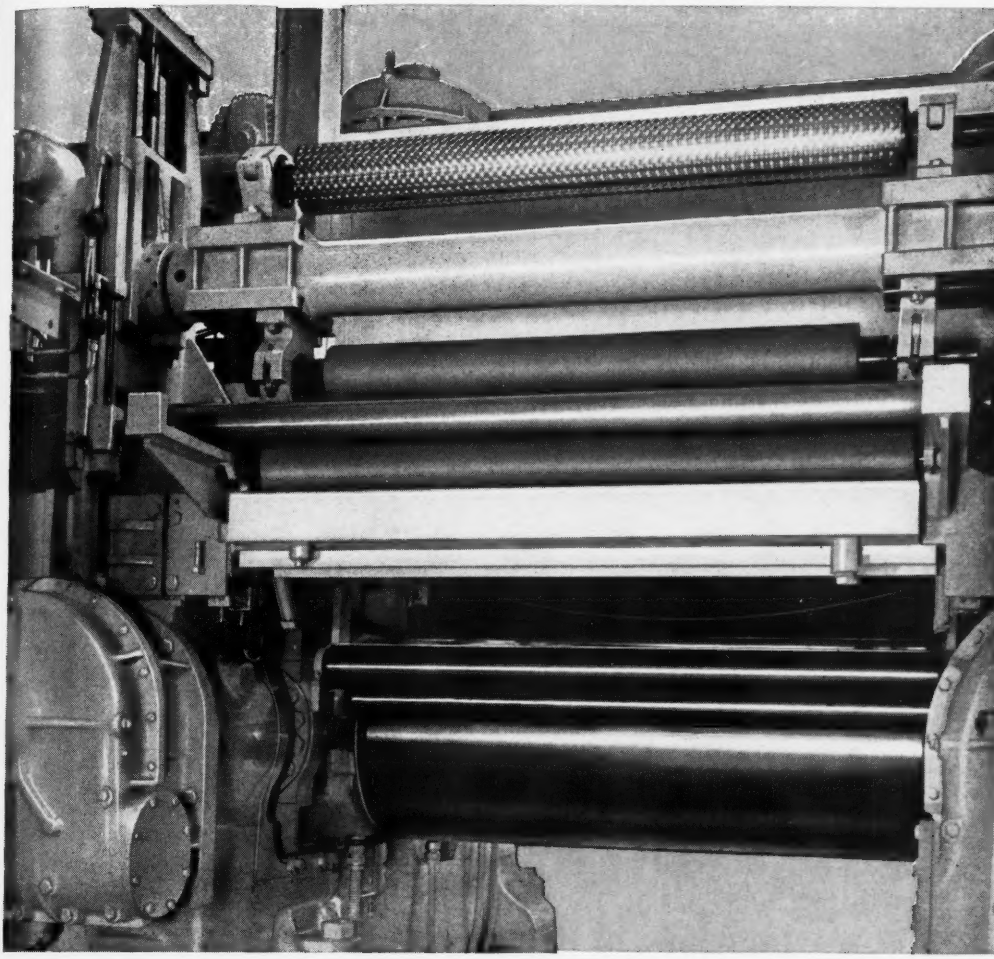
news of the rubber world

Morton Jacobson has joined the staff of RUBBER WORLD as technical editor. Mort brings with him experience in the rubber industry which started with The General Tire & Rubber Co., Akron, in 1943. He was later employed by Standard Products Co., Cleveland, and by Bushings, Inc., Royal Oak, Mich. His familiarity with tire products and mechanical goods will be utilized to help us keep abreast of the latest developments and to provide you with a balanced editorial coverage of the rubber industry. A member of Akron and Detroit Rubber groups, ACS, and ASTM, he will add to RUBBER WORLD's outstanding coverage of these and the other industry associations throughout the country.

The two-ply tire is now rapidly coming of age. Introduced on the compact cars, for the most part very quietly, these tires are scheduled to appear on many of the lower priced standard-size autos as the 1962-model year bows in. A major problem for tire manufacturer and auto maker alike is customer education. On the surface it is hard to believe that two plies can do the work of four. The industry is also worried about low-quality tires giving the whole two-ply program a bad name. Many in the industry, however, feel that the two-ply tire is the tire of the future. Story on page 96.

Compatability with other elastomers has allowed chlorobutyl rubber to be used in many applications to provide the properties of butyl without the processing difficulties. One very important use for this product, alone or in blends, is in the inner liner of tubeless tires to provide an effective air barrier. There are also many other uses already established or proposed for chlorobutyl. Some compounding tips on the handling of chlorobutyl which have been developed by Enjay appear on page 67 of this issue.

F. W. Stavely retired on July 1 as director of research at the Firestone Tire & Rubber Co. Under his direction and leadership, research with alkali metal catalysts resulted in the Firestone products Coral, IR, and Diene, BR, stereo rubbers. His interest in rubber started in his advanced degree work in 1917 and has continued during his varied career. We add our best wishes to those of the industry to Dr. Stavely. (See page 99.)



This plastics calender is one of the most versatile ever built

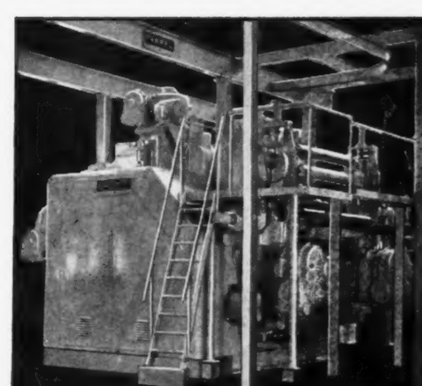
The Farrel calender pictured here was built for a company that processes a variety of plastics products. The machine will produce the full range—from the thickest sheeting to the thinnest film.

Contributing to its versatility is the new automatic turret embosser, shown above, which is designed to take all of the customer's existing rolls plus those to be used in the future. Two embossing rolls are carried in the turret. Either may be brought to the ready position within ten seconds by pushing a button — without breaking the sheet.

The calender, itself, is a 500°F Uni-drive machine, with an independent drive for the number 4 roll and a maximum delivery speed of 110 yards per minute. Operation at high temperatures under heavy loads is made possible by a special sleeve-bearing design.

Great attention has been given the lubrication system which uses twin pumps mounted in parallel for individual push-button operation. Other features include such well-known Farrel developments as two-speed motorized roll adjustment, motorized guides and the cross-axis device.

Discover for yourself how Farrel engineering pays off in calendering quality and versatility. Ask to see a Farrel engineer.



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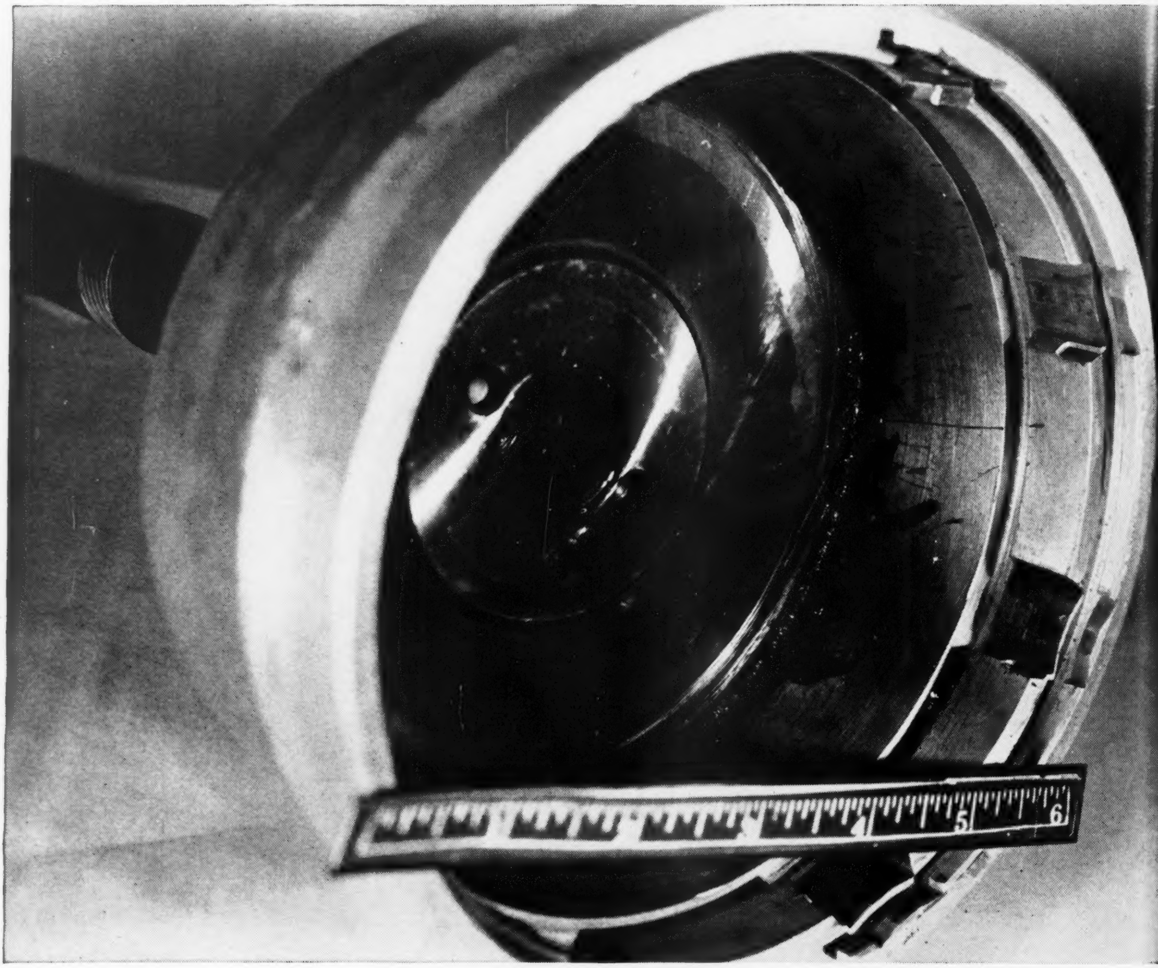

CYCLEWELD CHEMICAL PRODUCTS DIVISION, CHRYSLER CORPORATION

SEE WHAT RUBBER-BASE ADHESIVE CAN DO?

This is the housing of an automotive torque converter. It's joined to the output shaft by a thin film of thermoset cement.

The converter has just undergone torsional tests that wrecked its mechanical parts—with no effect whatever on the metal-to-metal bond. This bonding job is an achievement of Cycleweld Chemical Products Division of Chrysler Corporation.

A similar cement, made of nitrile rubber and Durez® phenolic resin, cut the cost of assembling an all-aluminum truck tailgate by eliminating 211 rivets and 42 welds.

Other heat-setting cements that marry rubber and phenolic resin show promise for:

- building new strength and quietness into car doors, deck lids, and hoods by edge-bonding instead of tack welding.
- attaching metal trim without drilling holes.
- easy-to-cast aluminum engine heads and intake manifolds, made in *two* sections bonded together with a leakproof, heatproof seal.

If you have a tougher-than-usual bonding problem—or expect to have one—now's the time to see what a rubber-phenolic adhesive can do for you. We'll be glad to put you in touch with people who make such adhesives.

We don't make these adhesives. We just supply some of the basic ingredients—phenolic resins that influence the qualities a good structural adhesive must have. Permanent, rigid set. Controlled tack. Heat resistance. Precise sameness from batch to batch. Good storage stability. Many superstrong adhesives are the result of teamwork between rubber chemists and Durez resin chemists backed by 40 years of experience.

DUREZ PLASTICS DIVISION

HOOKER CHEMICAL CORPORATION, 208 WALCK RD., NORTH TONAWANDA, N. Y.

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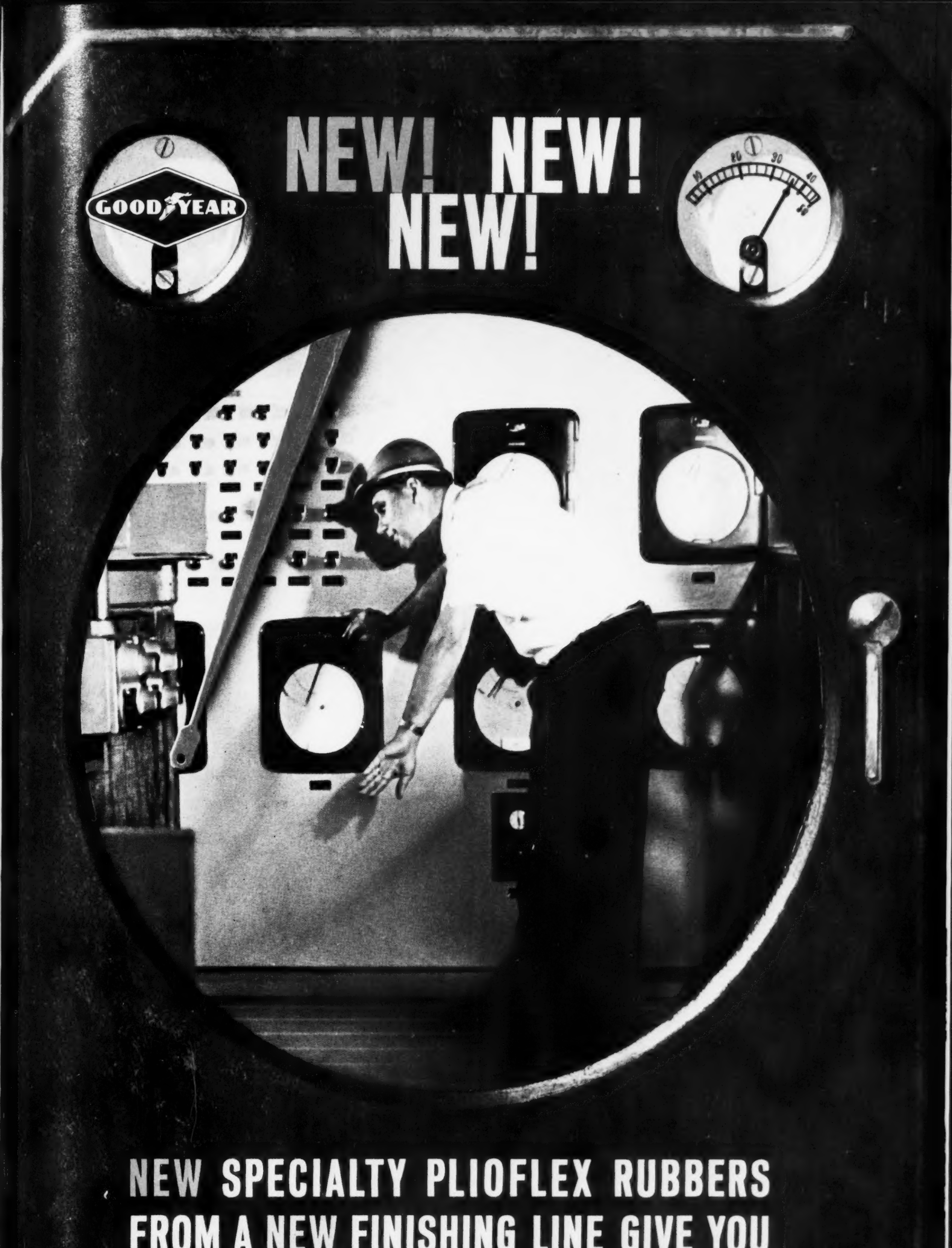
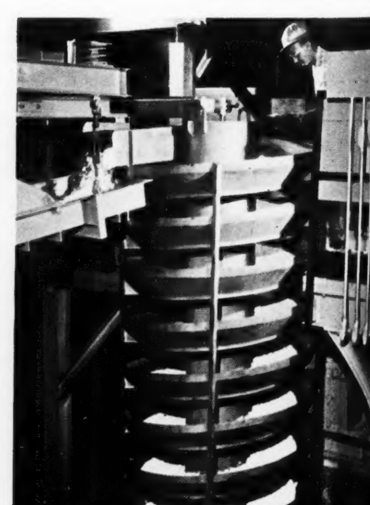

GOOD YEAR
NEW! NEW!
NEW!
NEW SPECIALTY PLIOFLEX RUBBERS
FROM A NEW FINISHING LINE GIVE YOU
NEW HIGH LEVELS OF QUALITY CONTROL

100% continuous processing and fi
possible new specialty Pliofle R

The world's first all-stainless steel polymer finishing line is now operating as your *continuous* assurance of closely controlled quality in new, special-grade PLIOFLEX rubbers. Combining the largest, *continuous* latex source with the latest techniques in *continuous* finishing, this all-new installation means that at Goodyear-Houston – world's largest synthetic rubber plant – the uniformity and purity of specialty rubbers is automatically controlled from reactor to bale.

First thing you notice about the new finishing line is its cleanliness. All equipment is constructed of gleaming stainless steel and housed in a brand-new building to remove the major

HIGH LEVEL OF PURITY for new specialty PLIOFLEX rubbers is achieved by combining the efficiency of largest, continuous latex source with the latest, most refined, continuous finishing techniques.



VERTICAL VIBRATING CONVEYORS hold contaminants to new low.

finishing at Goodyear-Houston make Rubbers of precisely controlled quality!

causes of rubber contamination – dirt, rust and other corrosion products.

Other unusual features include an expeller de-waterer which reduces the moisture content of the crumb rubber to 12%, compared to the conventional 40%, and reduces nonrubber impurities at the same time. This de-waterer also makes possible the use of a single-pass dryer, which means a shorter heat history for the end product. The dryer utilizes indirect heat and filtered air – eliminating the chance of contamination by carbon from the heat source or by impurities in the atmosphere.

Vertical vibrating conveyors are still another highlight of the new finishing line. Used at both ends of the dryer, they eliminate the chance of rubber crumb clinging to equipment – a common problem with closed pneumatic systems or bucket conveyors.

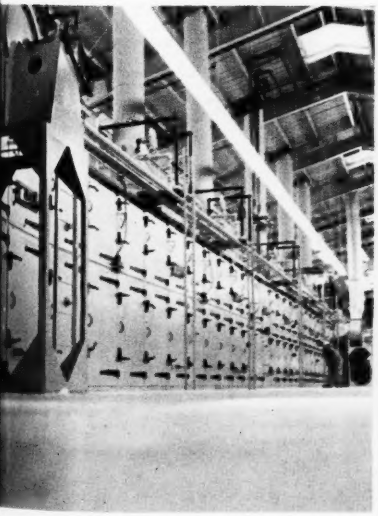
Most important of all, a complex system of automatic measuring and metering devices plus electronic controls assures that every step in the entire operation is precisely governed.

What do all these advances in quality control mean to you? A new and consistently high level of purity and uniformity in specialty styrene/butadiene rubbers.

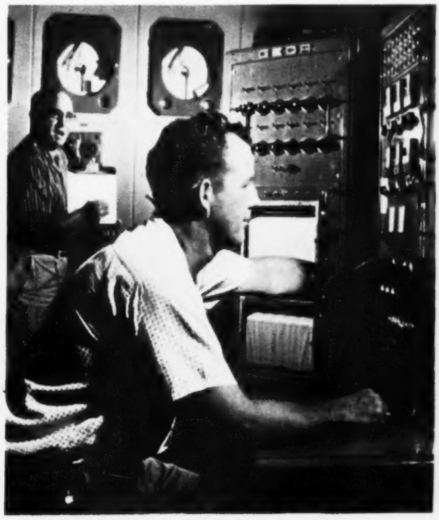
The specialty rubbers that will be produced on the new finishing line expand the already large PLIOFLEX family of fine rubbers. They are:

- ★ PLIOFLEX 1019, 1503, 1708, and 1715–Low Water Absorption rubbers.
- ★ PLIOFLEX 503A and 504A–LWA rubber/resin masterbatches.
- ★ PLIOFLEX 1006 – a special grade for the most exacting plastics modification.

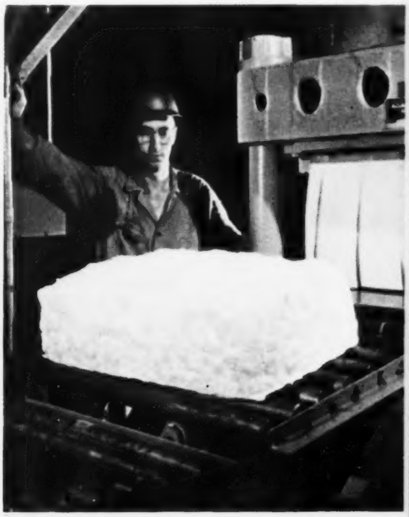
These new rubbers give you a significantly broader choice, particularly where you need high quality and uniformity for the manufacture of wire and cable coverings, plastics, shoe products, adhesives and other critical applications.



SINGLE-PASS DRYER, with indirect heating and filtered air, eliminates contamination from heat source.



PRECISION CONTROL DEVICES provide accurate step-by-step processing.



AUTOMATIC BALER puts the PLIOFLEX rubber you need in the package you want.

IN REGULAR OR SPECIALTY GRADES...

PLIOFLEX rubbers with Assured Processability are problem-solvers!

Here are some typical success stories:

Photo taken with cooperation of Schacht Rubber Mfg. Co., Inc., Huntington, Ind.

PROBLEM: Cut rejects in manufacture of low-cost, rubber flower pots.
PROBLEM-SOLVER: PLIOFLEX 1773. Although oil-extended, its excellent color and high uniformity permitted fast, continuous production of consistently acceptable products.

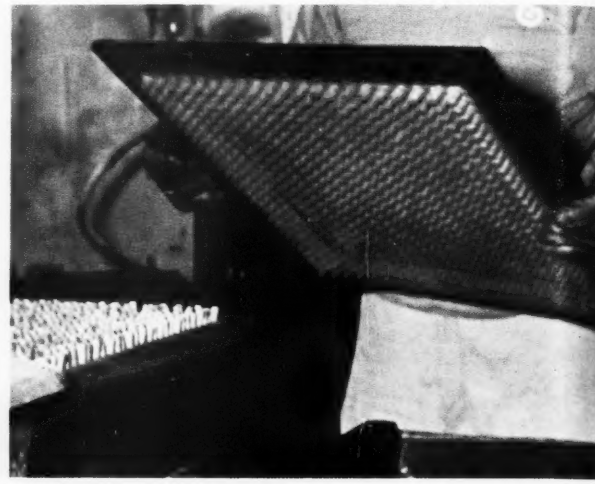


Photo taken with cooperation of Eberhard Faber Inc., Wilkes-Barre, Pa.

PROBLEM: Cut costs on daily output of 2 million pencil erasers.
PROBLEM-SOLVER: PLIOFLEX 1006. Its processing ease, uniformity and cleanliness eliminated premastication and permitted reuse of scrap without grinding, while providing a better aging product.

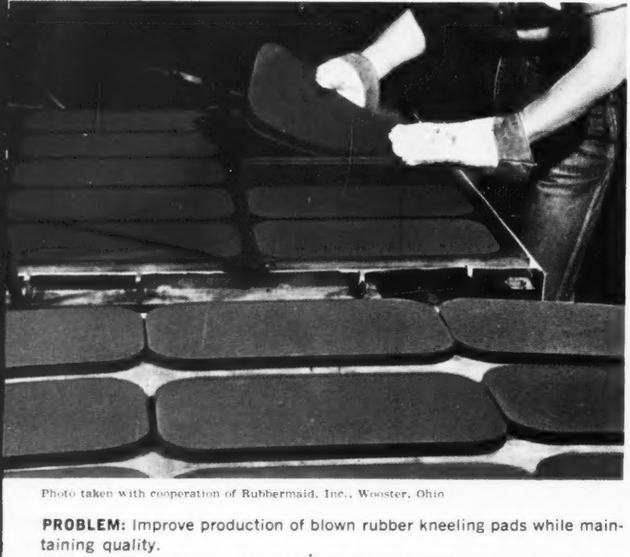


Photo taken with cooperation of Rubbermaid, Inc., Wooster, Ohio

PROBLEM: Improve production of blown rubber kneeling pads while maintaining quality.
PROBLEM-SOLVER: PLIOFLEX 1510. It reduced sticking, permitted lower curing temperatures and provided reworkable scrap. At the same time, it improved cell structure and tear strength.

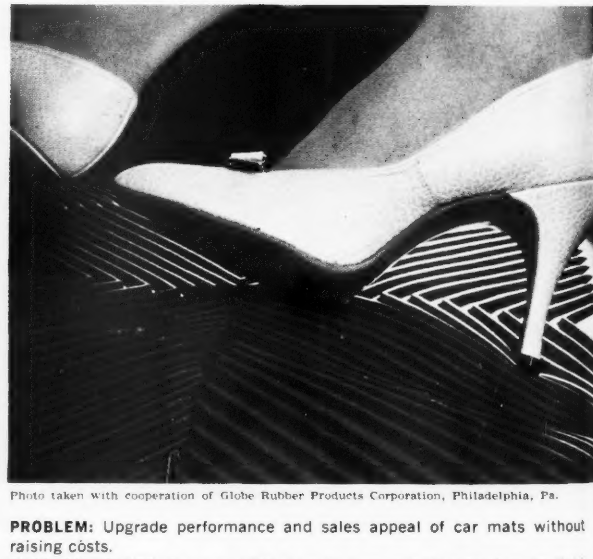
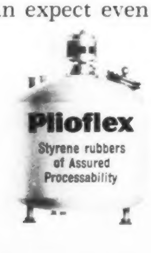


Photo taken with cooperation of Globe Rubber Products Corporation, Philadelphia, Pa.

PROBLEM: Upgrade performance and sales appeal of car mats without raising costs.
PROBLEM-SOLVER: PLIOFLEX 1778. Low in cost and oil-extended, its light color, uniformity and toughness permitted economical production of durable, brightly colored, highly salable mats.

These are just a few of many ways PLIOFLEX rubbers solve problems. Now with even more rubbers at your disposal, thanks to the all-stainless steel Houston finishing line, you can expect even more striking success stories coming out of your own plant. For pertinent data including the latest *Tech Book Bulletins*—plus outstanding technical assistance with your application—write Goodyear, Chemical Division, Dept. H-9418, Akron 16, Ohio.



Lots of good things come from

GOODYEAR

CHEMICAL DIVISION

Plioflex—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

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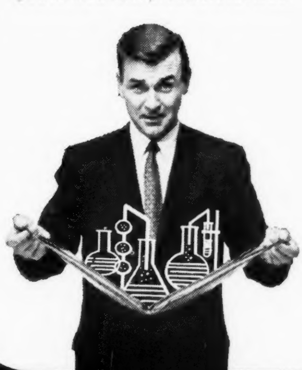
When you use Velsicol Hydrocarbon Resins, rubber takes a fast TACK!

Velsicol X-30 is a light colored resin that can be used in light colored, pastel shade pigmentations. It is an ideal softener and tackifier that keeps stocks pliable and easy to process. Velsicol's X-30 permits the highest loadings with no loss in quality, yet it makes rubber tougher, longer wearing and *more profitable!*

Work with this man . . .
Your Velsicol representative, a qualified chemist who can help you make better products for less!



VELSICOL *for quality resins, constant in supply, stable in price!*

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☐ Please send test samples of Velsicol X-30 Hydrocarbon Resins.
☐ Please send complete technical data. ☐ Have representative call.

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Types, grades and blends for every purpose, wherever Vulcanized Vegetable Oils can be used in production of Rubber Goods — be they Synthetic, Natural, or Reclaimed.

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technical books

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BOOK REVIEWS

"Trade Names of Rubbers, Plastics and Resins." Volume 3. Rubber & Plastics Research Association of Great Britain, Shawbury, Shrewsbury, Shropshire, England. 8¼ by 11¾ inches. Paper bound; 242 pages. $10.

This is the third volume of the RAPRA trade name listing, supplementing Volume 1, published in 1949 and covering the period from 1926 to 1949, and Volume 2, published in 1955 and covering the period from 1949 to 1954. Since this volume supplements Volumes 1 and 2, rather than being a complete list, it is unfortunate that Volume 1 is out of print. A few copies of Volume 2 are available, however, and may be had together with Volume 3 for a combined price of $15.

This invaluable volume contains a listing of all registered trade names, plus those for which registration applications have been made, covering, in all, more than 5,500 product listings, with the name of the manufacturer and a brief description of the product. This supplementary list of trade names is about as long as the first one published in 1949, although it covers only five years, compared with 23. It is no wonder, then, that with such a profusion of product names, the listing is an essential reference book.

Even for those who have the first two volumes of the listing (and most of us do not), the list would be more valuable if it were brought up to date in one volume, including such information as changes in trade names. Notwithstanding, this book should be in everyone's library.

"Proceedings of the Natural Rubber Research Conference, Kuala Lumpur, 1960." Rubber Research Institute of Malaya, Kuala Lumpur, Federation of Malaya. 7½ by 10 inches. Cloth, 986 pages.

Proceedings of the five-day session, held September 27 through October 1, 1960, include 76 papers, divided into the following sections on the rubber tree: nutrition, tapping and yield stimulation, ecology and environment, breeding and selection, and pests and diseases. Other sections are on chemistry and technology of dry rubbers, chemistry and technology of latex, biochemistry of latex, microbiology of latex, and factory treatment and applications of rubber.

(Continued on page 21)

how to vastly increase the useful life of rubber...

Consider the effect of your curing system on the effectiveness of a chemical antiozonant

In compounding rubber, use of a potent antiozonant like UOP 88 or 288 is essential in assuring maximum crack-free life. But do you realize what a vast difference may be made by your *curing system?*

Look at the two rubber test strips illustrated. Both were formulated with UOP 88 . . . but note how much more effectively the antiozonant worked when accompanied by this change in curing systems —a vast increase in resistance to cracking!

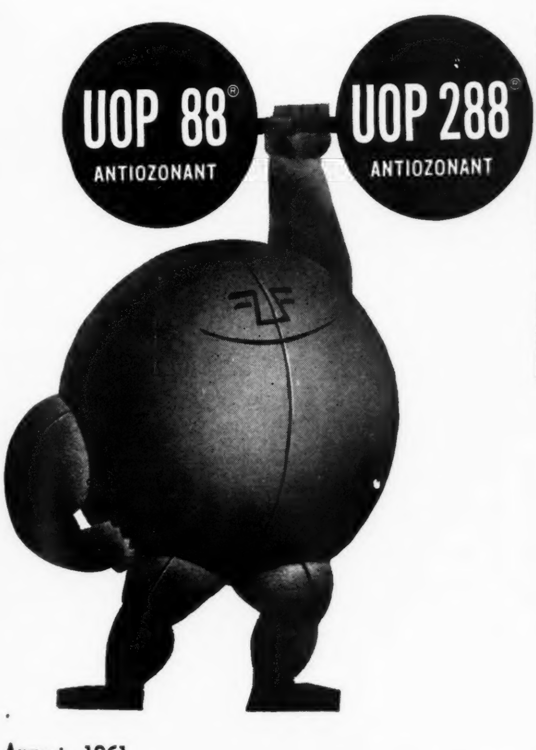
Help in achieving maximum effectiveness from UOP 88 or 288 antiozonants is available through UOP facilities and technical personnel. Just write or telephone our Products Department.

UOP ozone cabinets provide test conditions at a wide range of ozone concentrations.

The SBR specimens below were exposed to ozone at 100°F with 20 percent elongation for 52 hr. at 33 pphm ozone, then 187 hr. at 63 pphm ozone.

Carbon black—HAF (high abrasion furnace), Curing system — 4 phr tetramethylthiuram disulfide; Hours to first crack—7 to 23.

Carbon black—HAF (high abrasion furnace), Curing system—2 phr sulfur, 1 phr N-cyclohexyl-2-benzothiazole sulfenamide. No cracks in 239 hr.

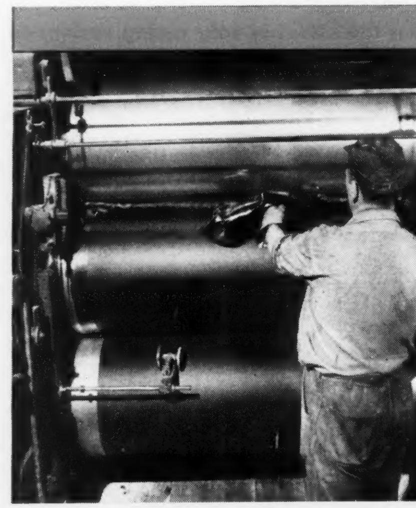


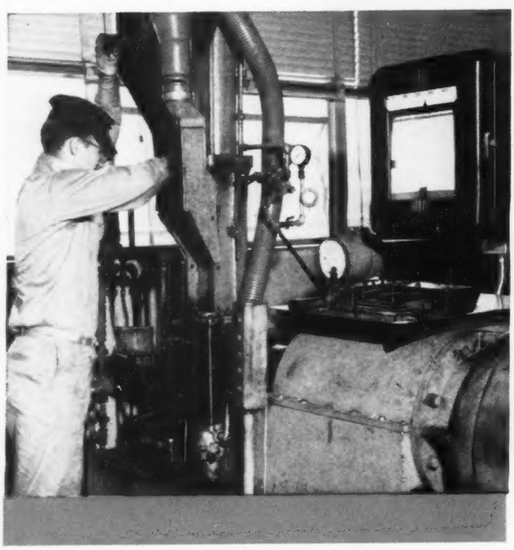
UOP®

UNIVERSAL OIL PRODUCTS COMPANY

30 Algonquin Road, Des Plaines, Illinois, U. S. A.

WHERE RESEARCH TODAY MEANS PROGRESS TOMORROW





COLUMBIAN CARBON: for

WHEREVER YOU ARE, SERVICE IS AVAILABLE TO YOU FROM THESE TECHNICAL SERVICE CENTERS:

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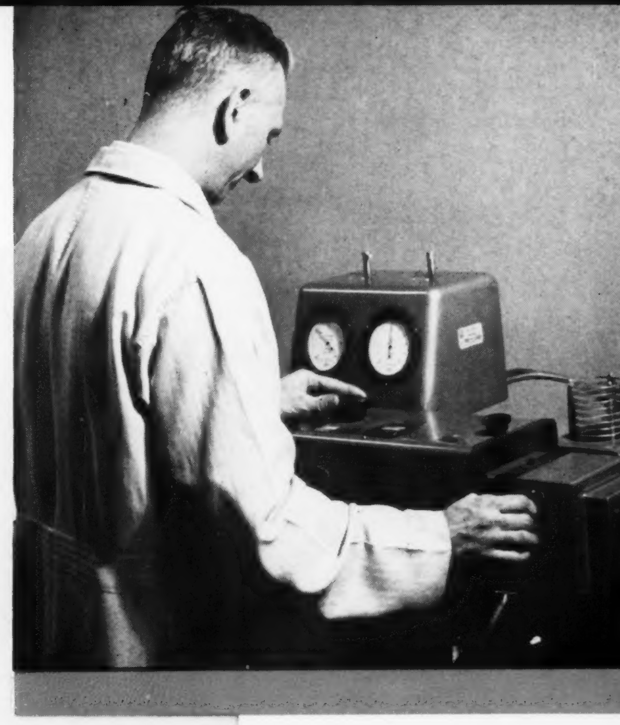
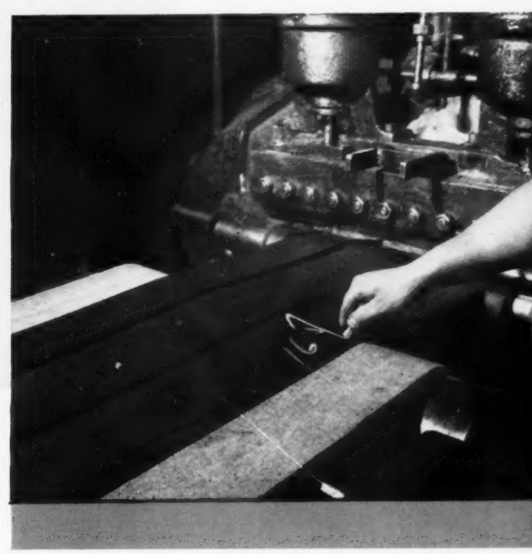
Akron, Ohio	Sao Paulo, Brazil
Monroe, La.	London, England

There are Columbian representatives located in these and 35 other countries around the world. To take advantage of Columbian Carbon technical service—no matter where you are located—contact your local Columbian representative.

International distributor: **COLUMBIAN CARBON INTERNATIONAL, INC.**





for technical service around the world

From the research that has made so many major contributions to the science of carbon-reinforced rubber . . . to the workable, practical ideas that provide greater production efficiency and improved products . . . Columbian's technical service team is rated outstanding throughout the industry! Today, as always, Columbian's technical service is a most potent reason for specifying Columbian blacks!

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about Columbian Carbon Blacks for rubber!

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City .... Zone .... State ....

RUBBER PRODUCTS ARE MORE COLORFUL...THANKS TO COLUMBIA-SOUTHERN CHEMICALS

Today's rubber goods come in a full range of colors. Manufacturers know that bright, rich colors add sales appeal, give products an extra push. Modern chemistry makes colorful rubber items possible by providing white reinforcing pigments—Columbia-Southern Hi-Sil,® Silene® and Calcene®—that permit the addition of a kaleidoscope of color to the rubber stock. ¶ In addition to chemicals for the rubber industry, Columbia-Southern Chemicals include such basics as chlorine, caustic soda, soda ash, solvents and other chemical materials used in just about every processing industry. Investigate the use of these quality materials for your operation and find out why so many leaders like working with Columbia-Southern Chemicals.

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technical books

(*Continued from page 16*)

In addition, the proceedings carry the texts of three talks given at the general session, one on the biogenesis of rubber, one on plant growth regulators, and one comparing the competitive position of natural rubber with that of the stereo rubbers.

Although the first half of the proceedings, on rubber tree cultivation and tapping, is of basic interest to the grower, the second half on chemistry and technology of rubber should be of considerable use to the processor, since it will give him not only a rundown on the new research going on in natural rubber, but a good briefing on processing of the straight and modified natural rubbers.

NEW PUBLICATIONS

Publications of Velsicol Chemical Corp., Chicago 11, Ill.:

"Resins for Rubber." Booklet No. 505-3. 2 pages.

"Resins for Adhesives." Booklet No. 505-4. 2 pages.

Publications of Naugatuck Chemical, Division of United States Rubber Co., Naugatuck, Conn.:

"Paracril OHT for Oil and High-Temperature Resistance." W. E. Galwardy. Bulletin No. 238. 8 pages.

"Delac-S—a Free-Flowing Dustless Accelerator in Prill Form."

Publications of OPW-Jordan Corp., Cincinnati, O.:

"Sliding Gate Pressure Regulators." Catalog J160-1. 8 pages.

"Extra-Sensitive Pressure Regulator." Bulletin PNB 5-61. 2 pages.

"Sight Flow Indicator." Bulletin NR 122. 2 pages.

"Shell Isoprene Rubber Type 50[illegible]." Technical Bulletin SC: 61-107. Shell Chemical Co., Torrance, Calif. 4 pages.

"How Silicones Aid the Rubber Industry." Bulletin Ref. 1-120. Dow Corning Corp., Midland, Mich. 8 pages.

"The Magic of Black." United Carbon Co., New York 22, N. Y. 6 pages. This booklet discusses carbon black in layman's terms.

"Chemi-Vic 400." The Goodyear Tire & Rubber Co., chemical division, Akron 16, O. [illegible] pages. The use of Chem-Vic 400 in oil-resistant soling is discussed.

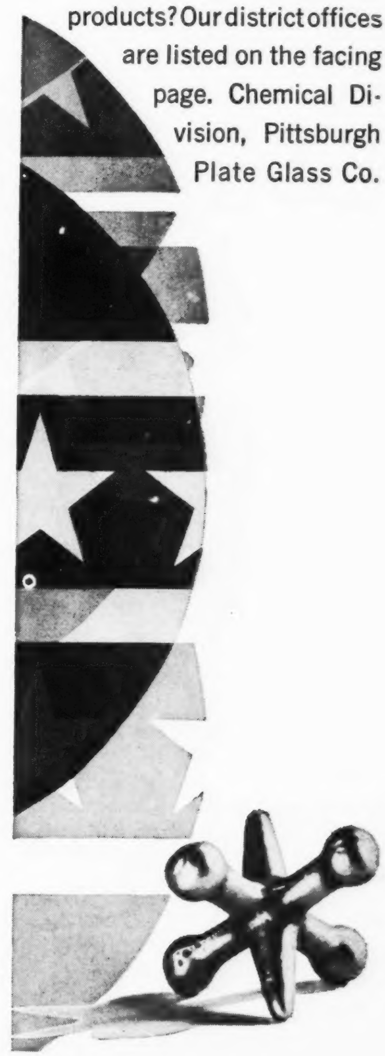
"How to Get the Most Out of Steam Cleaning." Oakite Products, Inc., New York, N. Y. 2 pages.

"Industrial Drying Ovens." Bulletin DO-61. The Carl Mayer Corp., Cleveland, O. 4 pages.

(*Continued on page 134*)

RUBBER PRODUCTS ARE MORE COLORFUL ... in the pages of BUSINESS WEEK

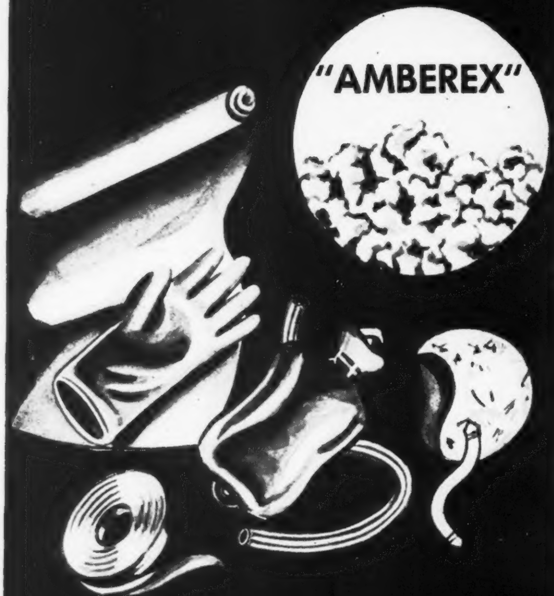
The colorful advertisement shown on the opposite page appeared in recent issues of *Business Week* and *Wall Street Journal* —total circulation over 1 million. Business and financial leaders were exposed to this message about the rubber industry, sponsored by the makers of the *white* reinforcing pigments—Hi-Sil, Silene and Calcene. May we help you look into the sales possibilities offered by colorful rubber products? Our district offices are listed on the facing page. Chemical Division, Pittsburgh Plate Glass Co.



ADD "AMBEREX" TYPE

Factice®

VULCANIZED VEGETABLE OIL
TO YOUR COMPOUND



for Rapid Incorporation Rate and Better Dispersement of Pigments.

Typical products using Factice® "Amberex" in compounding formulas.

The Amberex type of Factice® is made from various kinds of vegetable oils and in various degrees of polymerization. All are light colored, transparent, free from chlorine and have practically no ash.

There are six different Amberex types, each having properties for specific applications. The selection of the proper Factice® for a compound is important. Send us your formula for our suggestions. All formulas held in strict confidence. Our trained staff will help in selecting the proper vulcanized vegetable oil for your need . . . Factice®, White, Brown, Neophax or Amberex.

THE STAMFORD RUBBER SUPPLY CO.
STAMFORD, CONN.

new materials

New Synthetic Rubber Latex

The Goodyear Tire & Rubber Co., Akron, O., has announced development of Chemigum 520. This new synthetic rubber latex has been specially tailored for use in textiles and non-woven fabrics, such as paper towels, napkins, and tablecloths.

Improved binder materials, such as Chemigum 520, are rapidly broadening non-woven markets, according to John E. Warner, manager of the coating department. Through such latices, he pointed out, it is possible to design individual fabrics for specific end-uses.

The new material will be produced in Akron chemical division, where a $1¼-million expansion has been completed, increasing production capacity 15%.

Plastic Adhesive—Dekophane

Dekophane[R], a clear plastic adhesive for binding rubber to metal and glass, has been announced by The Crystal Essence Corp., Bound Brook, N. J. The material is basically a series of acrylic resin formulations containing alpha-pinene in organic solutions.

According to the company, Dekophane will bind rubber to glass and all types of metal surfaces. It effects a waterproof seal, maintains the adhesion for years, and does not become brittle.

Its usefulness is indicated in automotive weather-stripping and technical laboratory applications. Water emulsion formulations are also available for other uses.

Recco 159

A new plasticizer and tackifier, Recco 159, has been introduced by R. E. Carroll, Inc., Trenton, N. J.

It is a complex mixture of resinous and non-volatile aromatic esters recommended for use with acrylonitrile rubbers, vinyl chloride polymers and copolymers.

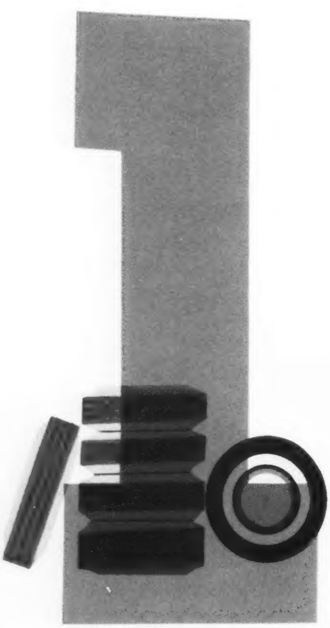
The high grease and oil resistance qualities of Recco 159 make it useful for gasoline- and solvent-resistant hose, gaskets, belting, and other mechanical goods. In addition to its intended uses, the company claims it can be substituted for more expensive polyesters.

(Continued on page 28)

MOST FINELY DISPERSED **CARBON BLACK** MASTERBATCH AVAILABLE

Before the Micro-Black process even begins, particles of carbon black are pulverized and ground to extremely small size—called "smoke". Then, in a series of mixing jets, the carbon black slurry, oil, and latex are mixed in a high shear agitation process. Velocity of the liquid stream at the nozzles actually reaches hundreds of miles per hour. The result is the most finely dispersed carbon black masterbatch available.

3 WAYS YOU SAVE WITH AMERIPOL MICRO-BLACK



IMPROVED PRODUCT QUALITY . . . carbon black is the best reinforcing agent—and the better the dispersion, the more carbon black contributes strength and resistance to wear. MICRO-BLACK's fine dispersion gives you the ultimate in quality and performance.

STREAMLINED STORAGE . . . Micro-Black is packaged for easy, fast handling, and eliminates the cost of in-plant storage of carbon black.

FASTER PRODUCTION . . . Micro-Black comes to you with latex and carbon already precisely mixed. This eliminates time-consuming weighing and milling operations, and shortens mixing time. And clean-up time between runs is reduced.

n
d
s.

ACK

ʀɪᴘᴇs OF DIFFERENT HARDNESS BASED ON AMERIPOL 4771

	A	B	C	D	E
meripol 4771	150.00	150.00	150.00	150.00	150.00
nc Oxide	4.00	4.00	4.00	4.00	4.00
aric Acid	1.00	1.00	1.00	1.00	1.00
ie Clay	—	100.00	100.00	100.00	100.00
odrite 2007	—	—	—	—	20.00
erite Resin D	0.75	0.75	0.75	0.75	0.75
n Anti-chek	0.75	0.75	0.75	0.75	0.75
0 Brown Sub	30.00	30.00	15.00	—	—
raflux #2016	15.00	15.00	7.50	—	—
cosol 2XH	15.00	15.00	7.50	—	—
ntocure	1.00	1.00	1.00	1.00	1.00
mate	0.10	0.10	0.10	0.10	0.10
lfur	2.00	2.00	2.00	2.00	2.00
TAL	219.60	319.60	289.60	259.60	279.60

PHYSICAL PROPERTIES OF TEST RECIPES

	Cure, Min. at 307°F	A	B	C	D	E
nsile, psi	5	1305	590	1135	1310	1305
	10	1430	950	1460	1590	1555
	20	1495	1130	1535	1695	1610
ngation, %	5	875	880	705	495	455
	10	770	800	595	415	390
	20	705	715	535	350	330
rometer hore A	5	33	51	60	78	90
	10	34	53	64	79	93
	20	35	54	65	80	94
mp. Method B	20'/320°F	41.0	61.2	46.8	39.6	42.1
ecific Gravity		1.11	1.35	1.39	1.48	1.45

ON
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ne-con-
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NEW OIL-EXTENDED AMERIPOL 4771 CUTS COSTS;

provides wide range of physicals with selective compounding

Ameripol 4771 is a new non-staining Micro-Black Masterbatch with 50-part oil extension for economy. Added oil makes a softer stock, with little sacrifice in tensile strength. 4771 reduces mixing costs and permits increased loading.

As with all Micro-Black Masterbatches, superior physical properties are obtained by the use of high shear agitation of the polymer, oil, and carbon black, followed by immediate coagulation.

A series of tests with different compounds based on Ameripol 4771 shows how you can economize on your inventory by using such a versatile Micro-Black. A wide range of hardness (frequently an important property in mechanical goods operation) can be obtained with selective compounding of Ameripol 4771. This permits carrying fewer compounds in stock to meet most major requirements.

In the test recipes listed here, a series of stocks of different hardness are all based on Ameripol 4771. Hardness can be increased or decreased as desired by varying the amount of filler and or softener to the base compound. The recipes shown vary in Durometer hardness from 35 to 94, and intermediate values can be obtained by blending.

It is believed that the work to date has given sufficient information to serve as a guide for conducting detailed application studies. In the low-cost, highly mineral-filled formulations it may be necessary to adjust the acceleration to compensate for the retarding effect of the clay.

Goodrich-Gulf Chemicals, Inc.

WORLD'S LARGEST SOURCE OF SYNTHETIC RUBBER

NOW...
20 MICRO-BLACK MASTERBATCHES OFFER A WIDE SELECTION OF PROPERTIES

With twenty grades of Ameripol Micro-Black now available, you can precisely select the combination of properties and costs that meet your requirements. And experience with the various grades have yielded enough data to provide an accurate selection guide.

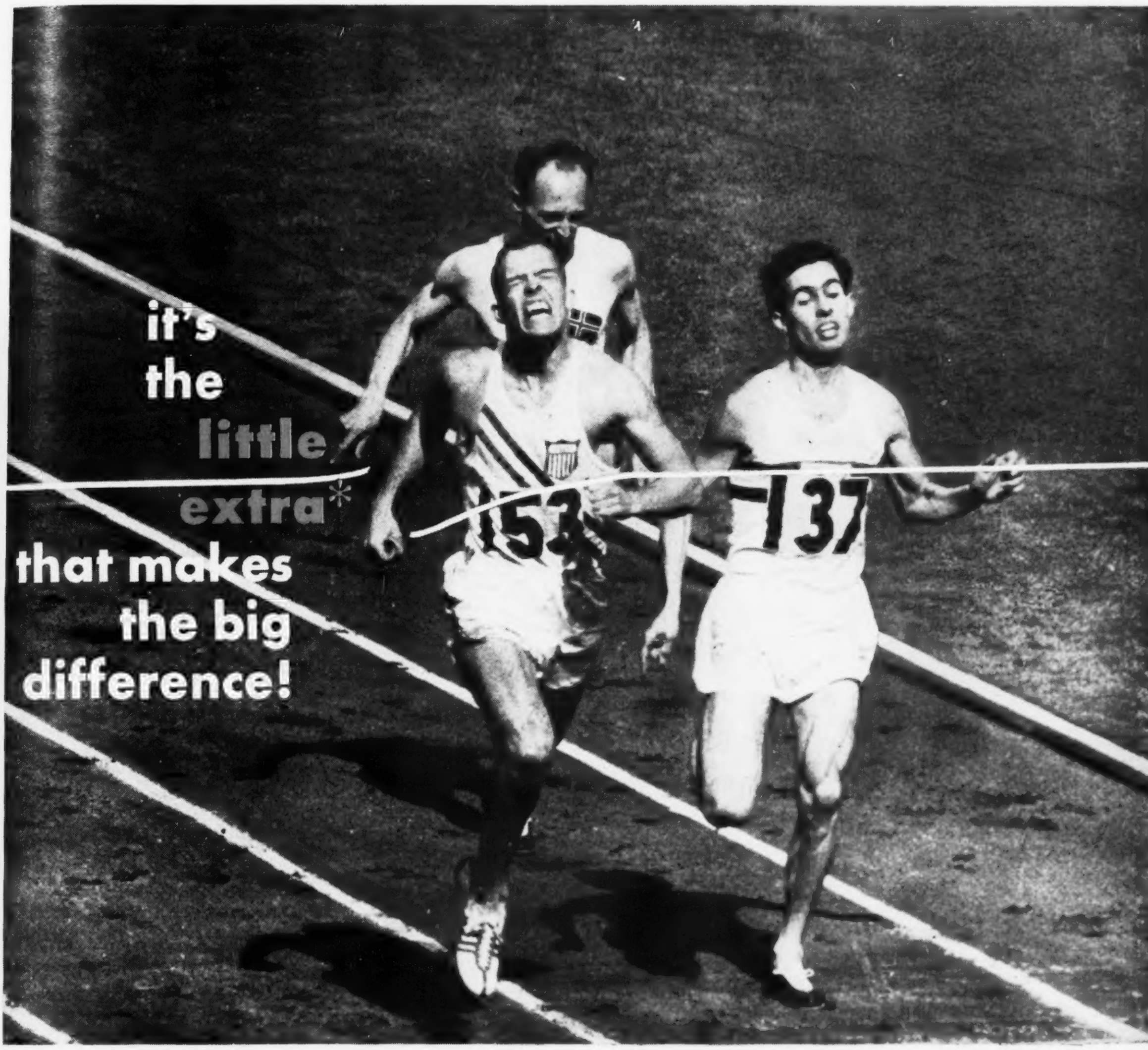
A new bulletin "Selection Guide to Ameripol Micro-Black Masterbatches" gives complete data and lists "Value Quotients" for the various grades.

A chart contained in this Selection Guide plots various tensile strengths (often a matter of prime interest) and pound volume cost. Use of the "Value Quotient" gives you an easy method of evaluating and selecting the masterbatch you need.

For your copy, write Goodrich-Gulf Chemicals, Inc., 1717 East Ninth Street, Cleveland 14, Ohio.

Goodrich-Gulf Chemicals, Inc.

WORLD'S LARGEST SOURCE OF SYNTHETIC RUBBER



* In a field of ten-second men, the all-important difference between victory and defeat is just a tick on the timer's stopwatch. In the rubber industry, it's the same way. Marbon Chemical, the pioneer in high styrene rubber reinforcing resins, constantly comes through with the added extras that make the big difference. Advantages such as a consistent high level of performance through rigid quality control, unsurpassed technical assistance, total reliability, complete research and development facilities, plus faster service through same-day shipments. Don't be satisfied with second-best. Go with the leader who is out front in the rubber resin field in every way—Marbon Chemical!

Get all the facts about Marbon high-styrene rubber reinforcing resins for shoe soles, floor tile, wire and cable, hard rubber and mechanical goods. Write Dept. W-8.

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SiPi
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CONSISTENT PURITY
99.5 minimum ZnO. Produced at SiPi by electronically-controlled Phillips Process.

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Guaranteed monthly production to meet customers' requirements.

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Personalized service, backed by a research and development team with extensive laboratory and production facilities.

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Over half a century of specialized SiPi service to industry.

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ZINC OXIDE • BRASS • BRONZE • ALUMINUM • LEAD • TIN • SOLDER ANODES • BABBITT • ZINC DUST • SHOT ALLOYS • ZINC BASE ALLOYS

new materials

(Continued from page 22)

Cyanox LF—New Antioxidant

American Cyanamid Co., Bound Brook, N. J., has introduced a new low-cost, non-staining antioxidant, Cyanox LF. It is a modified aldylated phenol and a clear light amber, slightly viscous liquid. It is non-blooming and has no effect on cure or processing qualities of the rubber.

White rubber samples containing Cyanox LF in contact with white appliance enamel give only a very slight stain after 48 hours in the ASTM D 925 contact stain test and no stain with white broadcloth after 88 hours in the A.A.T.G.G. gas fade oven.

Cyanox LF has good storage stability, a slight phenolic odor, and no accumulative toxicity.

General use of one part to two parts per 100 RHC is suggested in white and light-colored natural rubber, blends of natural rubber with stereo-regular rubbers, nitrile rubbers, neoprene, and SBR.

Urethane Odor Masks

The Noville Essential Oil Co., North Bergen, N. J., has developed three high temperature-resistant masking agents for urethane foam. Two of the materials are intended to give a clean scent of freshly laundered linen to foam pillows, mattresses, and other consumer items. The third is intended to neutralize amine mal-odors.

Visopox Foam Adhesive

The research division of Adhesive Products Corp., New York, N. Y., has announced the development of Visopox waterproof foam adhesive and coating, a 100% solids material containing neither water nor solvents, useful in bonding polyethylene, polystyrene, and polyurethane foam to themselves or to any other surface.

According to the manufacturer, Visopox combines the quick-grab of an elastomeric adhesive with the strength of epoxies, enabling the substance to adhere all types of foam insulation to ceilings and walls without the need of structural support to hold the insulation in place while curing.

Other advantages of the compound cited are its permanent flexibility, non-toxic effects, and its ability to withstand temperatures of —80° F., as well as its excellent bonding qualities at elevated temperatures. The material has an open time of about four hours and will cure in eight to twelve hours.

Visopox foam adhesive, said to be excellent as a sealer and calking compound, is waterproof, odorless, white in color, produced in various viscosities, and is available in one-gallon and five-gallon containers and in 55-gallon drums.

GET THIS NEW 24-PAGE PICCOPALE CATALOG!

Low cost and high bulking factors add immeasurable profits and versatility to the benefits of using this synthetic hydrocarbon resin. For instance, data included in this publication show that PICCOPALE provides two extra gallons of pure resin per 100 pounds, compared to another similar petroleum resin!

To help you explore the savings involved in using PICCOPALE resin, Picco offers this new catalog. It provides data on physical properties, storage and handling, applications, and detailed information on the various reactions and forms of resin utilized in many processes.

These processes include paint and varnish formulating, textile processing, paper converting, rubber compounding, floor covering manufacture, adhesive compounding, agricultural formulating, wax and rosin modification, blending with polyethylene and use in printing inks. Descriptions are also provided which indicate the usage of PICCOPALE in cement curing compounds, as an anti-dust coating, in waterproof packaging, and concrete curing.

Piccopale Resin is a neutral petroleum hydrocarbon resin which features low cost, light color, excellent compatibility and solubility, and extremely high water and moisture resistance.

PENNSYLVANIA INDUSTRIAL CHEMICAL CORPORATION
122 STATE STREET, CLAIRTON, PENNSYLVANIA

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MORE GOOD NEWS FROM
SYNPOL®

There's a SYNPOL to meet every SBR need

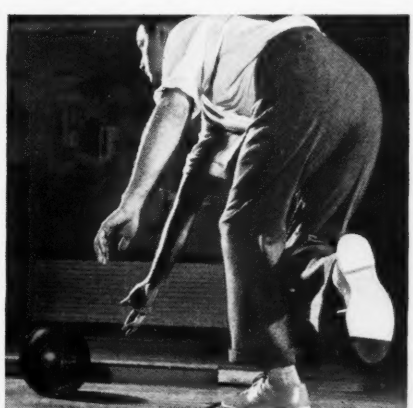
Undecided what synthetic rubber is best for your product? Fed up with the bother of buying from many sources?

Solve both these problems. Specify SYNPOLS and choose from over* 30 outstanding polymers that will add new value to present products... stimulate new ones... cover all your SBR needs.

Choose SYNPOLS for hard, tough rubbers that take maximum abuse. And soft rubbers for lasting resiliency. Or polymers for lightweight, flexible, and weatherproof coated fabrics.

Take advantage of SYNPOL coloring possibilities. SYNPOL polymers may be colored with light, bright pastel shades. These colors won't fade or stain... put added consumer acceptance into your product.

SYNPOLS are unsurpassed. And TEXUS chemists are developing new polymers every day for all types of processing... black, cold, hot, black oil-extended, and cold oil-extended resins. Try a SYNPOL. For information about any product application, write to the address below.



This ball*, made of a hard SYNPOL polymer, is everything a bowling ball should be... takes more punishment, provides livelier action for higher scoring. And although we don't see it, there's a good chance this kegler's bowling bag is made of a SYNPOL-coated fabric. The SYNPOL polymers' outstanding properties not only make them ideal for bowling gear but for equipment for all other sports as well.

**Bowling ball by Ebonite Company, Newton, Massachusetts*

←Non-marking SYNPOL SBR soles and heels** give his Oxfords more comfort, surer footing, better support for growing feet. In fact, he'll grow out of these Oxfords before they need resoling or heeling. The soles and heels on Dad's boots will take man-sized punishment, be lastingly comfortable, keep out sloppy weather. And Dad can increase his weather protection by adding a SYNPOL-coated jacket to his wardrobe.

***Soles & Heels by Avon Sole Co., Avon, Massachusetts*

TEXUS *Pace Setter in Synthetic Rubber Technology*

TEXAS-U. S. CHEMICAL COMPANY, 9 Rockefeller Plaza, New York 20, N. Y. JUdson 6-5220

DIAL RCI

ESTER GUMS All Types. Glycerine and pentaerythritol esters of gum, wood, polymerized wood, hydrogenated wood, dimerized wood and tall oil rosins.

PURE PHENOLIC RESINS Heat Reactive, Novolac Type, Thermoplastic and Terpene. A wide variety of resins intended primarily for tackifying and reinforcing neoprene, acrylonitrile and other synthetic elastomers.

PLASTICIZERS Polymeric and Chemical. A wide range of polymeric and monomeric plasticizers and epoxidized oils for the compounding of neoprenes, nitriles, and other synthetic elastomers.

CHEMICALS Phthalic anhydride, maleic anhydride, pentaerythritol, formaldehyde, methanol, phenol and phenol derivatives.

Creative Chemistry . . Your Partner in Progress

RCI **REICHHOLD**

REICHHOLD CHEMICALS, INC., RCI BUILDING, WHITE PLAINS, N.Y.

new products

To keep heavily loaded cars from sagging in the rear, General Motors Corp., Delco Products Division, Dayton, O., is marketing "Super Lift" shock absorbers with rolling lobe air springs designed by Goodyear Tire & Rubber Co., Akron, O. The shock absorbers are adjusted by injecting some air for a heavy load and letting it out for everyday driving. A crossover air tube between a pair of the shock absorbers keeps them under equal pressure

Color-striped silicone rubber for coding insulation

Striped Silicone Insulation

Boston Insulated Wire & Cable Co., Boston, Mass., recently was successful in developing a process for striping silicone rubber insulation used in multi-

...another industry first from ASRC

FIRST TO SCORE with its cold low Mooney rubbers, ASRC now takes another forward stride with the introduction of FLOSBRENE—the first commercially available *liquid* styrene-butadiene rubber.

To many manufacturers of rubber products FLOSBRENE offers opportunities for new applications, advanced processing procedures, improved formulations. Initial customer production experience with FLOSBRENE underscores the ease with which it can be mechanically weighed, preblended, mixed and fed... its adaptability to lighter mixing equipment... the savings it provides in processing aids, mixing time, power and labor.

VISCOSITIES

FLOSBRENE is available in several different viscosity ranges as follows:

VISCOSITY—POISES		FLUID NATURE	
25°C or 77°F	45°C or 113° F	Room Temp. 70-75°F	150°F
VLV less than 500	—	Easy flow	Very easy flow
LV 500- 2500	—	Lazy flow	Very easy flow
MV 2500- 7500	365- 765	Thin paste	Easy flow
HV 7500-12500	765-1135	Stiff paste	Easy flow

VLV—very low viscosity *MV—medium viscosity*
LV—low viscosity *HV—high viscosity*

COMPARATIVE PROPERTIES

A comparison of the physical properties of FLOSBRENE to solid SBR is shown in the following test formula—

FLOSBRENE or SBR-1004	100
Hard rubber dust	100
Sulfur	40
Zinc Oxide	2
Organic accelerator	4

In this formula, FLOSBRENE (type VLV) gave tensile strengths of 7430 at 4.3% elongation with a hardness of 83-81. Under identical conditions, solid SBR-1004 gave a tensile strength of 7600 at 5.4% elongation with a hardness of 83-82. An additional 3 parts of sulfur added to the FLOSBRENE compound brings the physical properties even closer to the solid SBR-1004.

EXTENSIVE APPLICATIONS

FLOSBRENE offers comparative advantages in a wide variety of applications:

- For pouring or casting in conventional open-top molds where inserts can be pressed into place
- For rotational casting, as in making vinyl playballs
- For frictioning onto fabric by the calender method, for tires and belts
- For spread coating by doctor blade, as in rain-proofing or rubber coating
- As an additive to asphalt for paving, roof coverings, etc.
- As a reinforcing agent in the manufacture of high impact polystyrene resins
- As the base stock in the compounding of cements, adhesives, hard rubber products
- As an effective plasticizer for solid SBR

For further information and no charge samples of FLOSBRENE, see your ASRC representative.

ASRC — THE FIRST NAME IN SYNTHETIC RUBBER

AMERICAN SYNTHETIC RUBBER CORPORATION

EXECUTIVE OFFICES AND PLANT • LOUISVILLE 1, KENTUCKY General Sales Offices: 500 Fifth Avenue, New York 36, N. Y.

1130 Second National Bldg., Akron 8, O. 38 S. Dearborn St., Chicago 3, Ill. 1909 Riverbend Pkwy., Fremont, O.

Institution of the Rubber Industry

LONDON

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The annual subscription is nominal and brings to members the bi-monthly TRANSACTIONS and PROCEEDINGS, which contain many original papers and important articles of value to rubber scientists, technologists, and engineers.

Members have the privilege of purchasing at reduced rates other publications of the Institution, including the *ANNUAL REPORT ON THE PROGRESS OF RUBBER TECHNOLOGY* (which presents a convenient review of advances in rubber), and a series of *MONOGRAPHS* on special aspects of rubber technology (monographs published to date deal with Tire Design, Aging, Calendering, and Reinforcement).

Further details are easily obtained by writing to:

SECRETARY
INSTITUTION OF THE RUBBER INDUSTRY
4, KENSINGTON PALACE GARDENS
LONDON, W. 8, ENGLAND

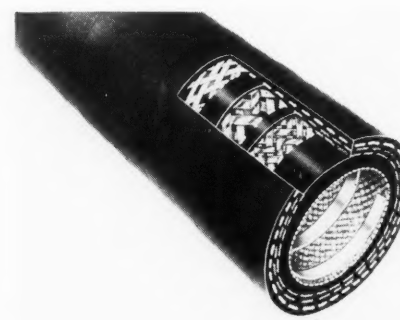
Telephone: Bayswater 9101

new products

conductor and single hook-up wire and cable. The new system, employing General Electric silicone rubber, permits the production of silicone rubber insulation with multicolor markings that will not rub off, and also allows a myriad of color combinations.

Color-striped insulation is said to permit the use of smaller wires in multi-conductor cables, resulting in lighter weight, extra flexible, reduced diameter cable. The smaller silicone insulated wires also are claimed to eliminate braids which are subject to fraying and moisture absorption.

Boston Insulated Wire now has color-striped silicone rubber wire available in AWG sizes 24 through 10.



Pile-driver burstproof steam hose

Ray-Man HD-Pile Driver Hose

Raybestos-Manhattan, Inc., Passaic, N. J., has developed a new burstproof steam hose designed for saturated steam at pressures up to 200 pounds (366° F.) and used for heavy construction work in pile drivers, steam hammers, portable pumps, etc.

Among the claimed features of the new steam hose contributing to increased service life and improved safety are its resistance to the harmful effects of oil and crushing, and its special construction eliminating sloughing of tube and costly fouling of equipment.

The tube is made of thick oilproof neoprene lined with asbestos fabric and heavy-gage flat steel spirals; while the cover provides high resistance to checking and abrasion. The strength member is two braids of high tensile, multiple strand, non-corrosive steel wire. Even with short radius bends, there is no close-off.

New Release Paper

Stick-Not #762, a new release paper for electrical tape, is available through Crocker, Burbank Papers, Inc., Fitchburg, Mass. It is strong, tear-resistant, and easily die cut for use as an interleaf to accelerate tape handling. (See RUBBER WORLD, April, 1961, page 30.)

Stop looking for spring wire in large coils...it's here (*courtesy of Roebling*)

This is really an enormous availability—3000 pounds of high carbon spring wire in a single, nonstop coil. You know what this means. Uninterrupted productivity. You make more of your products faster and, as with *any* length of Roebling spring wire, you make them better.

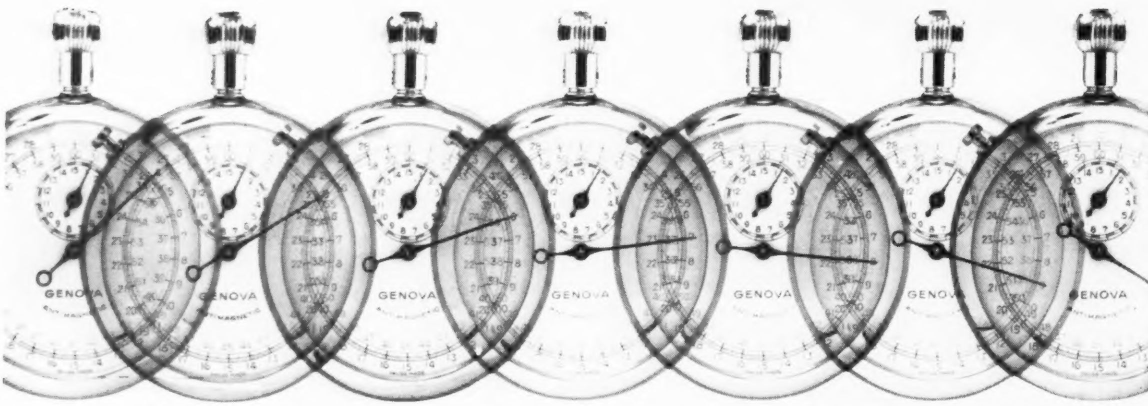
Another happy availability (also in large coils) is new Roebling Springkote* Wire. Springkote runs through feed rolls without slippage, stress relieves more uniformly and takes finishes better—yet costs no more than lime-coated wire.

For information on this ready abundance and on new Roebling Springkote, write Roebling's Wire and Cold Rolled Steel Products Division, Trenton 2, N. J.

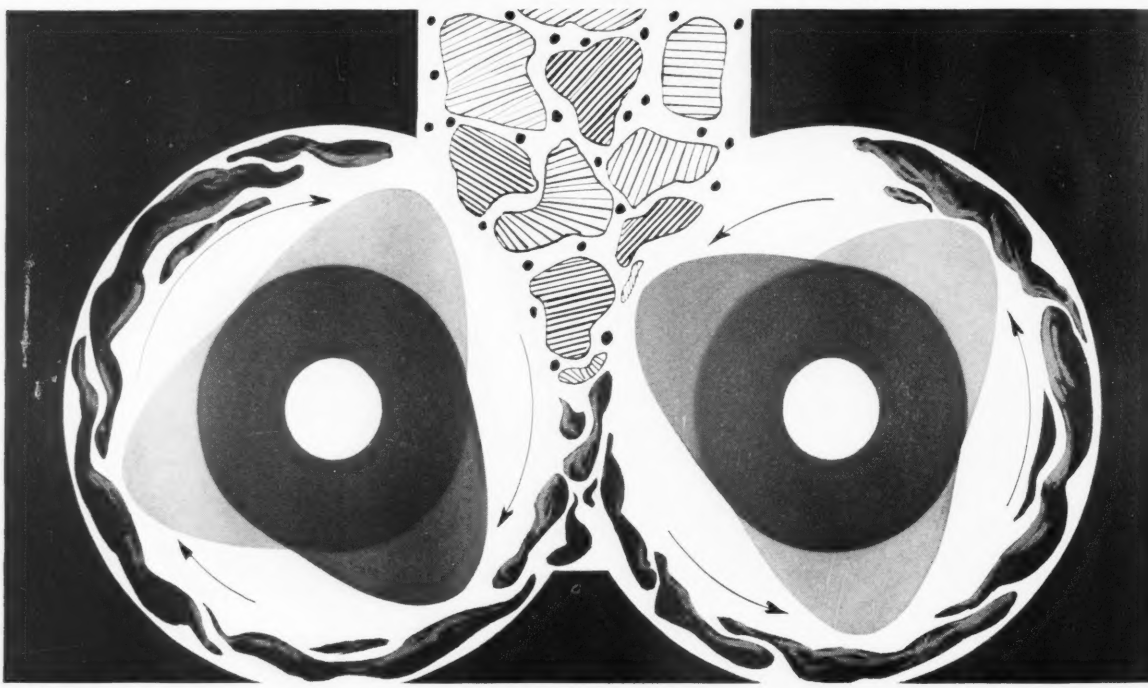
*Reg. applied for

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation



problem: cut costs by speeding up the mix!



solution:

FIRESTONE TECHNICAL SERVICE and DIENE

An automotive industry supplier encountered mixing problems in a sealant compound—a type used between lapped metal strips. Slow processing was hiking costs.

Firestone Technical Service recommended the use of *Diene** rubber, Firestone's dramatic new achievement in polymer chemistry. The result? With Diene in the mix, processing time and costs were cut substantially, allowing more efficient use of equipment.

Any other advantages provided by Diene? Lots of them. Excellent low temperature properties, vibration and noise dampening, greater resiliency.

Firestone chemists have found that when Diene is blended with natural or synthetic rubber, the resulting compound gains remarkable qualities that expand and excel the best features of both, including far greater resistance to wear, heat, cracking and aging.

If you have a problem that may concern synthetic rubber, take advantage of the technical services offered by Firestone, the world's largest and most experienced manufacturer of high-quality synthetic rubbers and latices. Just call your Firestone Technical Service representative or write Dept. 21-4 for information.

Firestone's Diene rubber plant is in full commercial production.

Firestone

SYNTHETIC RUBBER & LATEX CO.

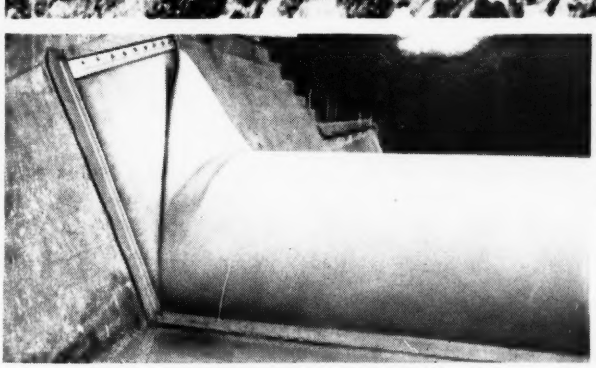
AKRON 1, OHIO

MAKING THE BEST TODAY STILL BETTER TOMORROW

Copyright 1961, The Firestone Tire & Rubber Company

*A Firestone trademark for synthetic rubber

Revolutionary fabric dam inflates, deflates to control flow of water



Left: view of one end of inflated Waialua Fabridam before rains raised reservoir level. Easily installed on concrete foundation.

Above: water flows over Fabridam, from Wahiawa Reservoir into tunnel leading to plantation, at rate of 175 million gallons per day.

Irrigating the ten thousand acres of sugar cane under cultivation by the Waialua Agricultural Company, Ltd., of Waialua, Hawaii, takes more than 25 billion gallons of water a year. To conserve extra water available during wet periods, a remarkable new "Imbertson Fabridam by Firestone" was installed in the spillway of the Wahiawa Reservoir.

Far less costly than conventional control gates, this light, flexible fabric dam increases the storage capacity of the reservoir by 500 million gallons. During the rainy season, it automatically deflates sufficiently to prevent flooding.

Wellington Sears supplied the nylon base fabric used by the Coated Fabrics Division of The Firestone Tire & Rubber Company for the Fabridam. With a tough neoprene coating, it has outstanding resistance to deterioration from age and abrasion—for a life expectancy of 15 years.

This is but another demanding use which Wellington Sears fabrics serve. We have wide experience in engineering cotton and synthetic fabrics to specific jobs—and are always ready with sound technical assistance. For a copy of our illustrated booklet, "Fabrics Plus," write Dept. H-S.

WELLINGTON SEARS WEST POINT TEXTILES

FIRST in Fabrics for Industry

For mechanical goods, coated materials, tires, footwear and other rubber products

Wellington Sears Company, 111 West 40th Street, New York 18, N.Y. • Akron • Atlanta • Boston • Chicago • Dallas • Detroit • Los Angeles • Philadelphia • San Francisco

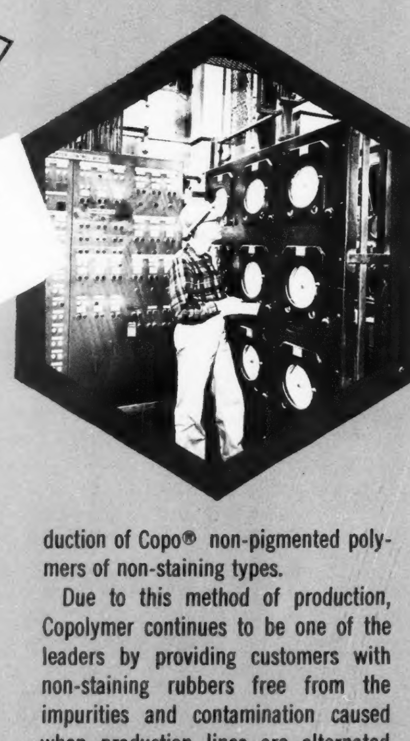
Copolymer

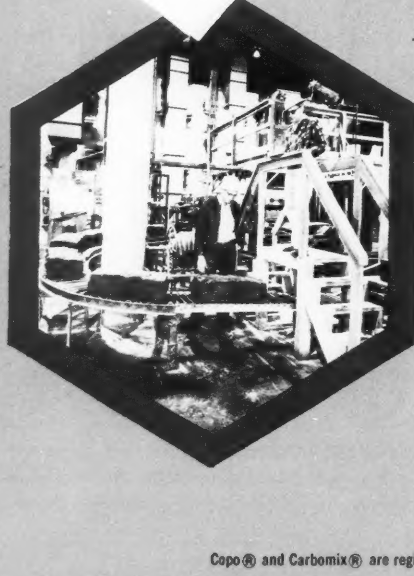
PICTURES OF PROGRESS

TWO NEW AUTOMATIC PRODUCTION LINES

Greater accuracy . . . increased production capacities . . . new standards of quality and uniformity—these are the extra customer benefits which have resulted from the addition of two new production lines at Copolymer!

Of the two new facilities, one will produce both Carbomix® black masterbatches and Copo® non-pigmented polymers of staining types. The second line is devoted exclusively to the production of Copo® non-pigmented polymers of non-staining types.

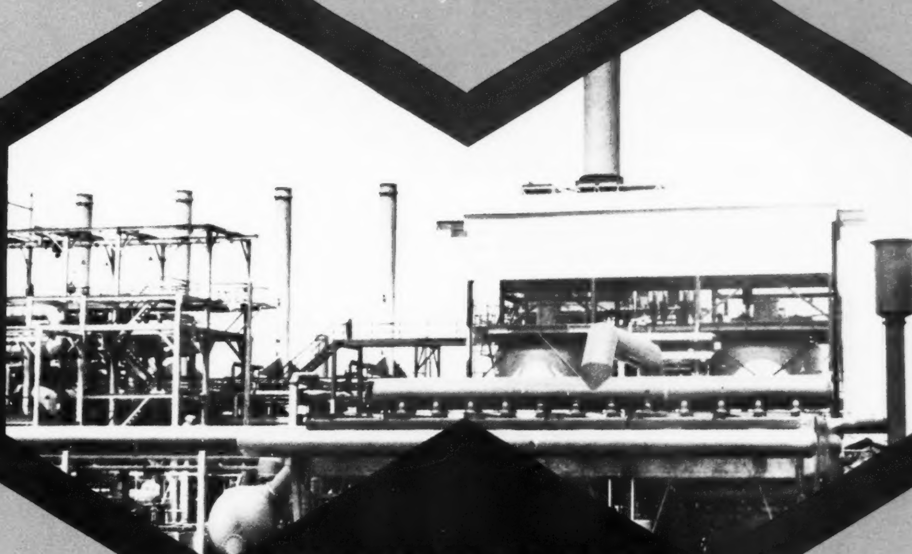




Due to this method of production, Copolymer continues to be one of the leaders by providing customers with non-staining rubbers free from the impurities and contamination caused when production lines are alternated from staining to non-staining types.

These expanded automatic facilities—part of the continuing growth at Copolymer—mean greater production capacities to meet the increased demands for Carbomix®. They mean greater product uniformity and purity, too—due to longer production runs with more exacting control of operational variables.

Copo® and Carbomix® are registered trade-marks of Copolymer Rubber and Chemical Corporation.



NEW DOW CATALYST BUTADIENE UNIT—
2nd BUILT IN THE U.S.

Planned growth and progress at Copolymer include the on-stream operation of the new Dow catalyst process for producing butadiene.

One of two such installations in the nation, the process was built to augment Copolymer's existing production facilities . . . and has boosted its butadiene production by 50%—providing a steady, readily-available uniform raw material supply.

These are Pictures of Progress . . . of Copolymer's constant search for the "better way" to provide customers with the quality rubber they want—when and where they want it.

Copolymer

RUBBER & CHEMICAL CORPORATION
Phone: Elgin 5-5655 P. O. Box 2591, Baton Rouge, Louisiana

Your Copolymer representative can help you with a recommendation of the best Copolymer product for your manufacturing use.

CONTACT ONE OF THESE COURTEOUS, COMPETENT SALES REPRESENTATIVES, TODAY!

M. D. "Skip" Morris	Akron, Ohio WAlbridge 8-3226
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Grant Rickard	Atlanta, Georgia PLaza 3-7833
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A. E. "Art" Bailey	Hartford, Connecticut CHapel 7-5731 Philadelphia, Pennsylvania LOcust 3-4663

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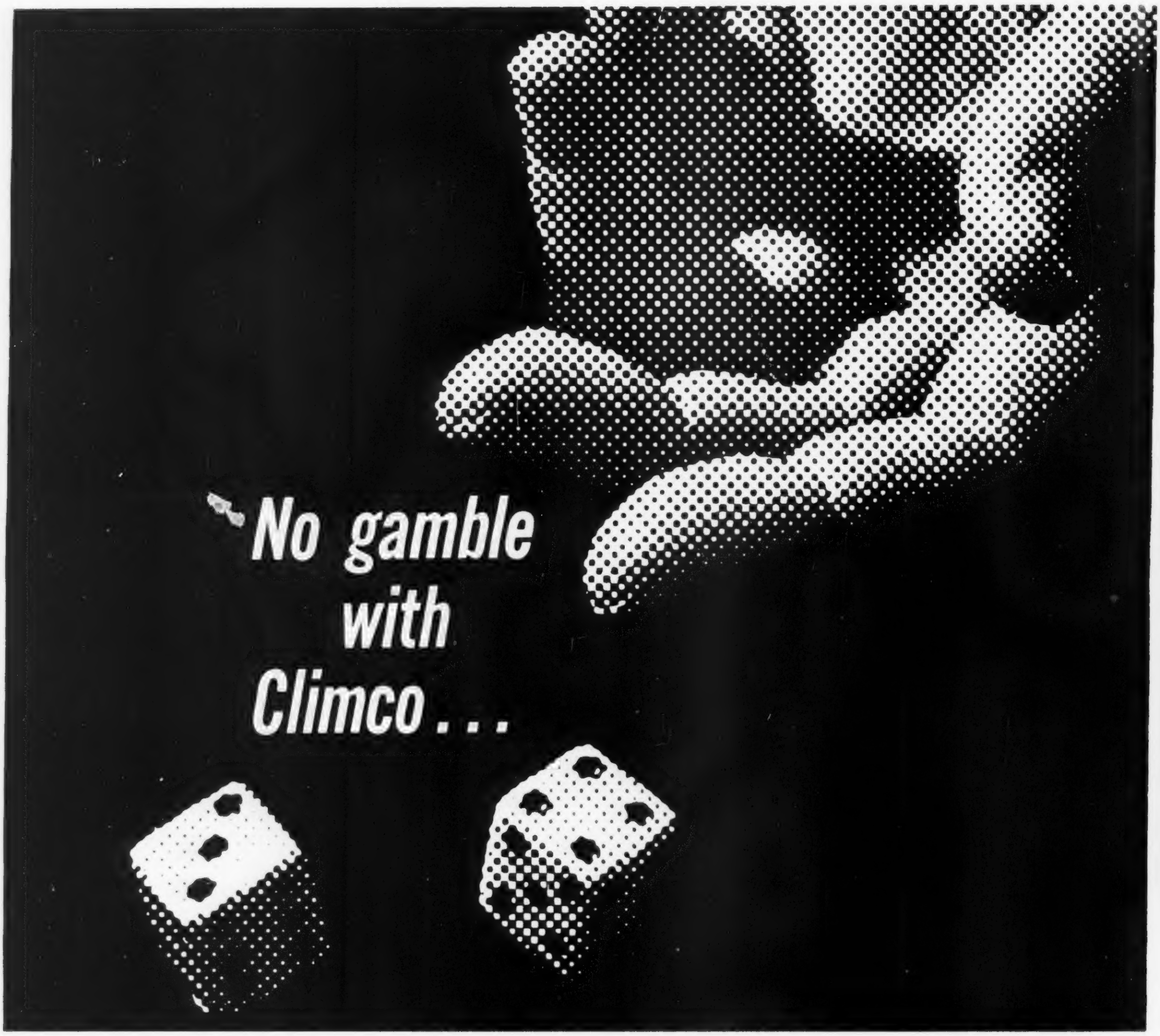
B. E. "Bert" Dougherty	Los Angeles, California MAdison 4-9511 San Francisco, California YUkon 6-5493



LINERETTE PAPER

beats adhesion in lightweight stocks

Every roll is tops in quality – Linerette Paper preserves tack but provides quick and easy separation of lightweight stocks. Linerette eliminates objectionable cloth marks . . . contains no oil or wax that might migrate to stock. In die-cutting operations, clippings can be worked away with regular scrap; where cleanliness is essential, Linerette is a low-cost lining for trays and containers. Stocks can be calendar-fed into Linerette and shipped that way to avoid return charges on fabric.

Along with these advantages, Linerette Paper has versatility in size as well. It is available in any width up to and including 54″, in rolls of 9″, 11½″, 13″ and 15″ diameters, on cores of 3″ i.d. The yield is approximately six square yards to the pound. A 9″ roll contains approximately 375 linear yards and a 15″ diameter approximately 1150 linear yards. Odds are that you can benefit right now with Linerette. Ask for sample and prices today; just specify the width required.

THE CLEVELAND LINER & MFG. CO.
5508 Maurice Ave. • Cleveland 27, Ohio • U.S.A.
Cable Address: "BLUELINER"

FREE BOOKLET
Send for the complete story today on Climco Processing.

CLIMCO

PROCESSED LINERS AND LINERETTE INTERLEAVING PAPER

Leading rubber plants all over the world operate our

Hydraulic Belt Presses

We supply belting presses with a working width up to 10 feet.

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EAGLE-PICHER

...an important source of lead and zinc compounds for the rubber industry

Eagle-Picher offers you a comprehensive line of both lead and zinc compounds, produced with highest quality control standards to your exact specifications.

Our customer service and research staffs are geared to answer your special needs . . . with courteous dispatch and resourcefulness.

Zinc Oxides	Litharge
Basic White Lead Silicate	Sublimed Litharge
Basic Carborate of White Lead	Red Lead (95%-97%-98%)
Sublimed White Lead	Sublimed Blue Lead

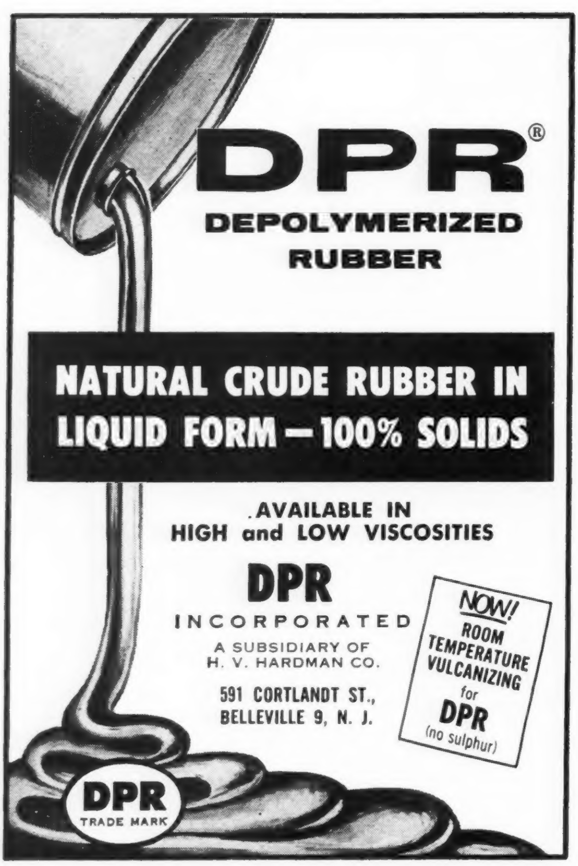
Lead Peroxide

EAGLE EP PICHER

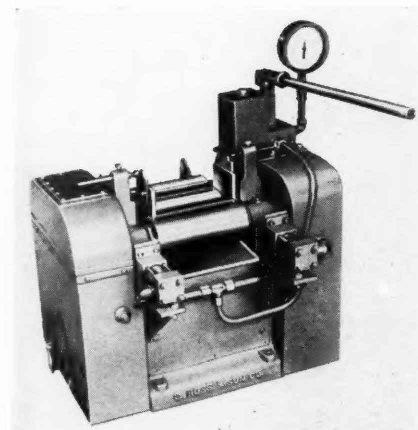
Since 1843

The Eagle-Picher Company

Department RW-861
Cincinnati 1, Ohio



new equipment



Ross high-speed three-roll mill

New Three-Roll Mill

New high-speed three-roll mills with simplified hydraulic adjustments have been introduced by Charles Ross & Son Co., Inc., Brooklyn, N. Y.

Mills in sizes from 4½ by 10 to 16 by 40 inches are available. Dual hydraulic adjustment permits independent front and back roll adjustment. For floating center roll operation, a single simplified hydraulic adjustment with a pressure gage eliminates the four separate adjustment points on conventional mills. Special equalizers are incorporated to assure equal pressure on both ends of rolls for parallel adjustment and uniform dispersion. A special overload feature is built into each mill to prevent damage to the hydraulic system if foreign matter falls into the mill.

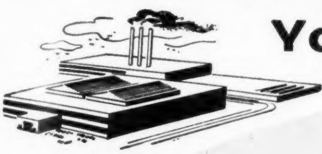
Setting and cleanup time is greatly reduced, and reports indicate that up to 20% production increases have been experienced.

Film Stretcher

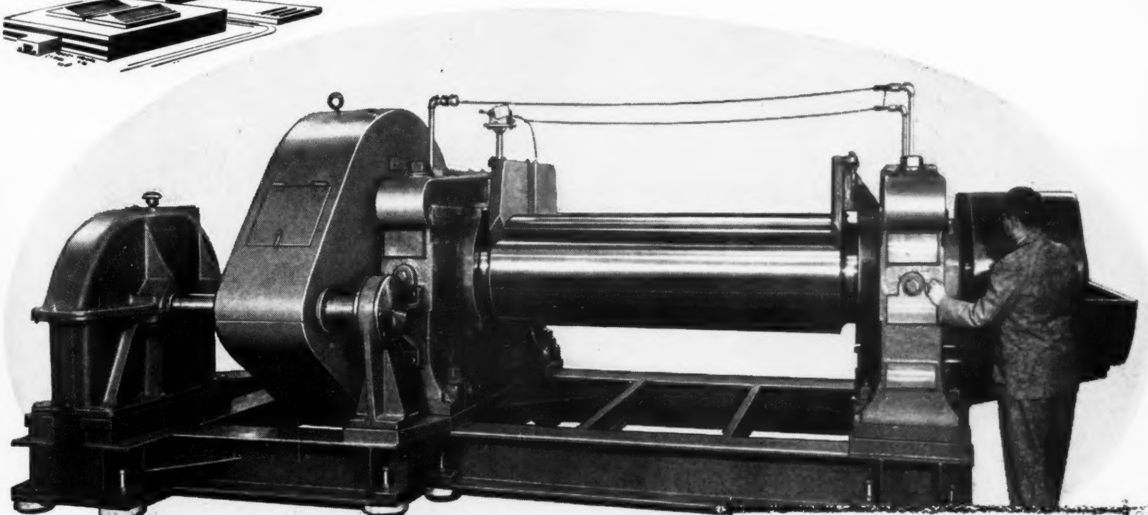
T. M. Long Co., Somerville, N. J., is marketing a laboratory-scale film stretcher which provides uniaxial and bi-axial stretching of polymer and elastomer films and sheets to improve their strength through molecular orientation while maintaining closely controlled conditions of temperature and elongation. Through automated operation 50 samples can be stretched per hour to investigate the effects of process change upon physical properties.

Whether you are planning on

EXPANDING or UPDATING



Your Mill Facilities . . .



General Tire & Rubber Co. has selected Adamson United Mills of the type shown for exclusive use in a new tire plant they are operating in Mayfield, Ky.

Plan on

ADAMSON UNITED MILLS

for rubber or plastics processing

Yes, whether your plans are for one mill or many, standard or special mills, Adamson United can meet your requirements with mills recognized industry-wide for high production efficiency and trouble-free operation.

Standard units are available in a wide range of sizes from 6″ x 16″ to 28″ x 84″, as well as special sizes and types to meet specific requirements. They can be supplied driven individually, in pairs, or in groups on a line shaft. When equipped with leveling-type vibration mounts with fabricated base as illustrated, or with hot-rolled steel plate base, costs of mill installation are substantially reduced . . . on a sturdy floor in good condition, no special foundation is required.

For other new installations Adamson United engineers have drawn on years of experience to produce new simplified mill units which combine only the most desirable design and operational features . . . the result being mills of highest quality offered most economically. Call on Adamson United to help plan **new** installations, or to update existing facilities. We welcome the opportunity to serve you.

7078

Plants at Pittsburgh, Vandergrift, Wilmington, Youngstown, Canton

ADAMSON UNITED COMPANY

730 CARROLL STREET, AKRON 4, OHIO

Subsidiary of
United Engineering and Foundry Company

DESIGNERS AND BUILDERS OF BASIC MACHINERY FOR THE RUBBER, PLASTICS AND PLYWOOD INDUSTRIES

NEW N-S HOSE WIRE PACKAGE

STEP 1

Hose wire reels are inserted in egg-crate container lined with a polyethylene bag.

STEP 2

A dessicant is added to absorb moisture and air is evacuated from the bag. The bag is then vacuum sealed.

STEP 3

Container is covered and steel-strapped to a non-returnable pallet for greater protection in transit and ease of handling

GIVES GREATER CORROSION PROTECTION

Now you can store hose-reinforcing wire longer without fear of corrosion that would weaken the wire and rubber bond. National-Standard engineers have developed a new polyethylene packaging system that does the job for you.

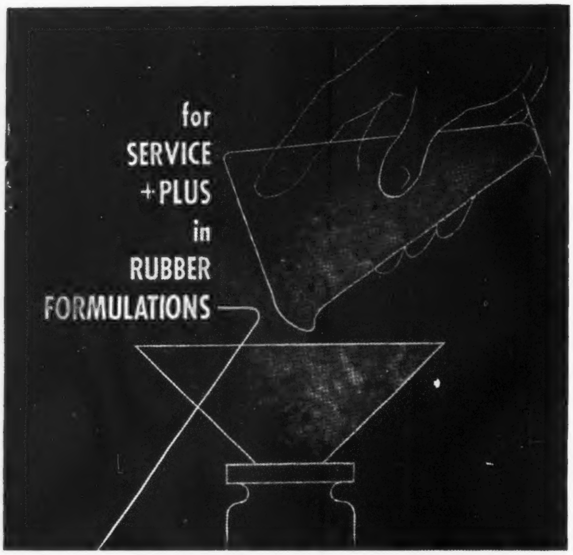
Spools of hose wire are inserted between egg-crate-like cardboard partitions in a corrugated container, lined with a polyethylene bag. A silica-gel dessicant is added to absorb moisture in the bag, the air is evacuated, and the bag is sealed. The container is covered and steel-strapped to a non-returnable pallet.

In one test, hose wire packaged in the new National-Standard container showed no corrosion whatever after six weeks inside a humidity chamber. Vacuum-packed bead wire, first introduced by National-Standard over three years ago, has proved the value of this packaging technique.

ANOTHER NATIONAL-STANDARD FIRST in the field of wire-in-rubber development, the new hose wire vacuum package becomes a significant addition to the long list of N-S contributions to the rubber industry. Whenever you have a wire-in-rubber problem, let National-Standard put this experience to work for you. For additional information, write National-Standard Company, Niles, Michigan. R-61-1

NS NATIONAL-STANDARD COMPANY

NATIONAL-STANDARD COMPANY
Niles, Michigan



Use CLAREMONT Cotton FLOCKS

Claremont has served the rubber industry for over thirty years as a supplier of quality flocks produced to fit specific requirements. Whether used inside or outside, as a filler or as a finish, the superiority of Claremont Cotton Flocks is recognized by all users.

Used as a compounding agent in the manufacture of mechanical rubber goods and general sundries, Claremont Flock Fillers provide reinforcement, improve tear and abrasion resistance. Claremont flock finishes for rubber fabrics provide a wide range of appealing textures that are uniform and long-wearing. In many applications the proper use of a Claremont flock will substantially reduce production costs.

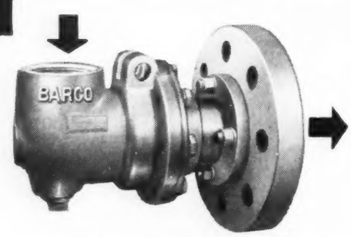
Claremont's knowledge of the industry's needs and its capacity for large production and quick delivery have made it the country's foremost producer of cotton flocks. Samples will be furnished upon request for laboratory and test runs. Inquiries invited!

CLAREMONT FLOCK CORPORATION
CLAREMONT, NEW HAMPSHIRE

The Country's Largest Manufacturer of Flock

BARCO *Flanged* **ROTARY JOINTS**

Designed for easy installation and accurate control of concentricity.



NEW TYPE CF

HERE is the rotary joint by Barco that gives you everything you want in design and performance:

EASY INSTALLATION—Only an end wrench required to draw up or loosen 4 nuts for installation or removal.

CONTROLLED CONCENTRICITY—No rotating "wobble". Accurate pilot diameter on sleeve establishes and holds concentricity. Tight seal.

WIDE SPACED BEARINGS—Two, instead of one . . . increased bearing area. No lubrication required. Nickel coating standard for shaft and rotating surfaces.

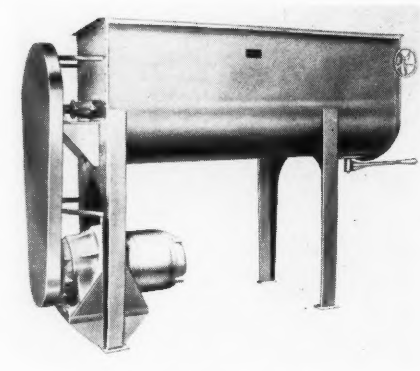
RESISTS SEAL RING BREAKAGE—Seal ring is under compressive, not tensile, loading.

200 P.S.I. STEAM RATING—Super duty performance. Sizes 1½", 2", 2½", 3". Single flow or syphon flow. For steam, air, water, oil, gas. Temperature to 450°F, or 600°F under certain conditions.

ASK FOR CATALOG

BARCO MANUFACTURING CO.
510J Hough Street • Barrington, Illinois
In Canada: The Holden Co., Ltd., Montreal

new equipment



New precision mixers

New Mixing Equipment

Machinery & Equipment Division of Superweld Corp., North Hollywood, Calif., is marketing new mixing equipment. Available in standard, vacuum, rotary drum, tumbling, and coaxial ribbon models, the mixers are said by the manufacturer to feature unit-welded construction; easy access covers with mechanical, sliding, folding, bolted, or hinged panels; elliptical orifice knife gates for accurate flow rates and minimum "dead pocket" areas; and self-lubricating bearings for simplified maintenance. The company also reports that the Super-Mix rotor design results in maximum mixing efficiency and more rapid batching operations.

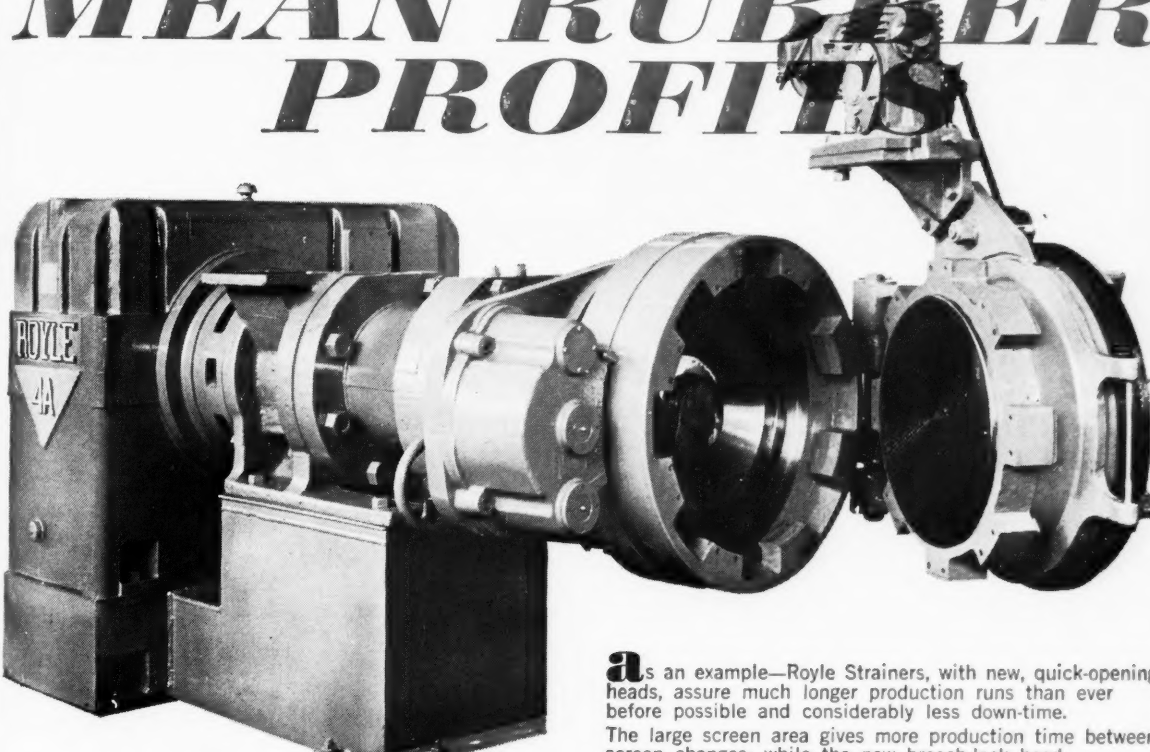
Plastics Casting Unit

The Leal Corp., Oaklyn, N. J., has developed a machine which can be used to cast plastics based on reactive resins such as epoxy resins, polyester resins, polyurethane foams, and others which set by the admixture of two or more components.

Called the Mark 11/25, the new device embodies the "Turvort" mixing head which makes possible push-button molding of reactive resin materials and which employs automixing principles that assure intensive mixing, the company reports.

The new unit is of the shot type which can dispense one or more shots of mixed material by the actuation of a push-button or other electrical trigger. The Mark 11/25 is a plunger piston-pump unit where the two plunger pumps are driven by an air motor simultaneously at the required rates to deliver the proper proportions of resin and hardener to the mixer head, where they are mixed and dispensed. The machine can be used for such jobs as potting or encapsulation of electronic components, casting shoe heels from urethane elastomers, molding gears from rigid urethane or polyester materials, and dispensing reactive adhesive materials for production cementing operations.

ROYLE STRAINERS MEAN RUBBER PROFITS



Royle 4A Strainer

As an example—Royle Strainers, with new, quick-opening heads, assure much longer production runs than ever before possible and considerably less down-time.

The large screen area gives more production time between screen changes; while the new breech-lock head, with automatic hydraulic-pneumatic operation allows for quick screen changes.

There are many other practical advantages built right in to Royle Extruders, for instance:

Heavy Duty Gear Case—with self-lubricating, opposed helical gears that were Royle designed and engineered specifically for strainer operations.

Powered Cut-Off Knife—with either rotary or up-and-down motion and adjustable cycling to give variable length products.

Longer L/D Ratios—allow mixing operations to be performed in the extruder. This gives a continuous and, hence, more economical mixing method than other operations.

Write today for complete Royle Strainer information. There is no obligation on your part.

ROYLE
Paterson, N. J.

John Royle & Sons, 6 Essex Street, Paterson 3, N.J.

Please, send me full information about Royle Strainers.

Name____________________ **Title**__________
Company____________________________
Street______________________________
City_________________ **Zone**______ **State**______

JOHN ROYLE & SONS

Pioneered the Continuous Extrusion Process in 1880

Home Office, V. M. Hovey, J. W. VanRiper, SHerwood 2-8262. **Akron, Ohio,** J. C. Clinefelter Co., BLackstone 3-9222. **Downey, Cal.,** H. M. Royal, Inc., TOpaz 1-0371. **London, England,** James Day (Machinery) Ltd., Hyde Park 2430-0456. **Tokyo, Japan,** Okura Trading Company, Ltd., (56) 2130-2149.

THE CHIEF SAYS:
"INVESTIGATE OUR LINE OF REBUILT AND USED EQUIPMENT... THE BEST IS OUR STANDARD"

EEMCO

machinery as good as new at a fraction of the cost!

SERVING INDUSTRY SINCE 1878

- 1600 TON BALDWIN . . . BARGAIN PRICED
  15 opening curing press 48 x 54" platen —2½" dalite with oil-gear pumping unit and complete automatic loader and unloader timers. And complete instrumentation.
- #9 BANBURY
  200/400 HP Motor for 23/46 R.P.M.
- FARREL UNI-DRIVE MILL
  22x26x84" on 6" plate, continuous base.

Send for complete list, convert your idle equipment to cash . . . trade-ins accepted

erie engine & mfg. co.
ERIE, PA . . . PHONE GL 4-7111

EXPORT RUBBER & PLASTICS IMPORT

SCRAP • VIRGIN • RECLAIMED

HARD RUBBER DUST

GROUND RUBBER

ALL GRADES AND MESH SIZES

SAMPLES UPON REQUEST

CHEMDYE RUBBER CORP.

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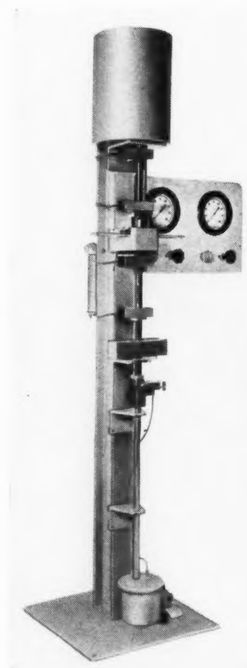
MURRAY HILL 7-3034

RELIABLE DEPENDABLE

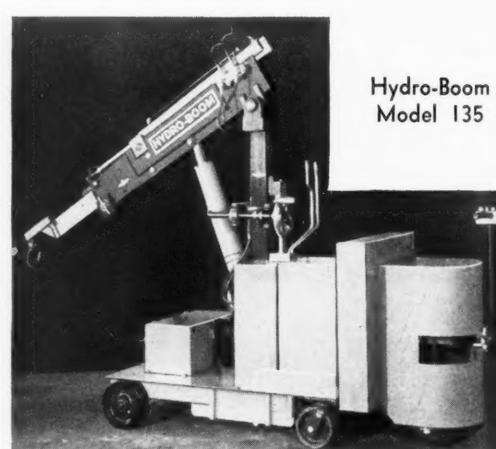
new equipment



Ball Impact Tester

T. M. Long Co., Somerville, N. J., is marketing an instrument for laboratory investigation of impact strength, ductility, elongation, and tear resistance of sheet-form material from films and foils to packaging materials, fabrics, leather, plastics, and rubber as heavy as tire casings.

Calibrated penetrators are driven through the sample at speeds up to 770 feet per second, attaining impact energies in excess of 30-foot-pounds while sensing changes in impact resistance as small as 0.000018-foot-pounds.



Hydro-Boom Model 135

Mobile Floor Crane

A new mobile floor crane has been announced by Vanguard Mfg. Co., Cleveland, O. Called Hydro-Boom Model 135, the new unit is capable of lifting 3,000 pounds with the hook 48 inches beyond the front edge of the platform. The boom movement is hydraulically controlled and permits 1/100-inch control of the hook in six directions: up-down, in-out, and right-left. The equipment can be used for changing dies, molds, grinding wheels, machine tool accessories, and motors.

(Continued on page 62)

The largest modern dry ice car made today—50 ton capacity.

CO_2 promptly delivered where you want it... as dry ice... liquid... or gas

ThermIce has established distribution centers in ten strategic areas, listed below. Modern 80 ton liquid CO_2 depot storage tanks assure constant supply. All these distribution depots are now in full operation, completely staffed and equipped. • Fifteen ton bulk liquid trailers and insulated dry-ice vans speed delivery to you. For something special in CO_2 service—call ThermIce today!

Biggest and finest liquid CO_2 car in the industry. 70 ton capacity.

Subsidiary of **PUBLICKER INDUSTRIES INC.**

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Washington, D. C.—ENterprise 1-3553
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St. Louis—PRospect 6-0860
Boston—ANdrew 8-5250

Call Hall

HALLCO NEWS

Issued by
The C. P. Hall Co.
Chemical Manufacturers

No. 17

LOW TEMPERATURE PLASTICIZER FOR VINYL AND RUBBER

Dioctyl Azelate C-498 is an ester-type technical grade plasticizer, low in volatility and in water extractions. It imparts good light and heat stability and is highly recommended for calendered films, sheets, coated films, dispersions, plastisols and extrusions. Users report that C-498 is an excellent softening agent for synthetic rubbers, especially the nitrile type. C-498 is manufactured by: The C. P. Hall Co.

LOW COST PLASTICIZER AND WETTING AGENT FOR VINYL AND RUBBER

Another quality plasticizer, C-325 is reported to do many jobs at lower cost with smaller amounts needed. It is a primary plasticizer for nitro-cellulose, chlorinated rubber, polystyrene and other synthetics, imparts permanent flexibility. C-325 also is ideal as a secondary softener for many vinyl resins. As a wetting agent for colors and pigments it produces a finer grind, more stable dispersion, and serves as an effective anti-livering agent. For nitrile type rubbers, C-325 is a good low temperature plasticizer, producing compounds that will pass the ASTM Test at temperatures to —65° C. It is manufactured by: The C. P. Hall Co.

Be Accurate: Call it PARA-FLUX® only if it came from The C. P. Hall Company

The C. P. Hall Co.
CHEMICAL MANUFACTURERS

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Protox zinc oxides cut mixing costs and increase Banbury output through rapid dispersion in all types of elastomers. The above masterbatches of 70 parts of oxide and 30 of rubber were mixed for three minutes in a "00" laboratory Banbury. Protox-169 (top) is completely dispersed, but untreated zinc oxide (bottom) requires further mixing to disperse the aggregates.

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(Advertisement)

A utility ballplayer is never known as a great second baseman or a superior tackle. He only achieves true recognition from his manager and other ballplayers. When a crisis arises, he has the chance to be a star. It is not very often that we can transfer such an analogy to a raw material. However, GPF carbon black is definitely in this category. It wasn't developed for a specific end use. Carrying the ballplayer analogy a step further—we can say that the comparable term to a "ballplayer's ballplayer" is that GPF could be called the "compounder's carbon black." It is good for a variety of uses and allows the ingenuity and creativeness of a compounder to produce a variety of black combinations.

Today we may be experiencing the beginning of a new phase in GPF usage. Compounding costs are on the rise and GPF can replace many long standing carbon black combinations. This may then be the catalyst or crisis which will cause GPF to assume a new stature.

CARL SNOW
Manager, Field Technical Service
United Carbon Company, Inc.

A Product in Perspective

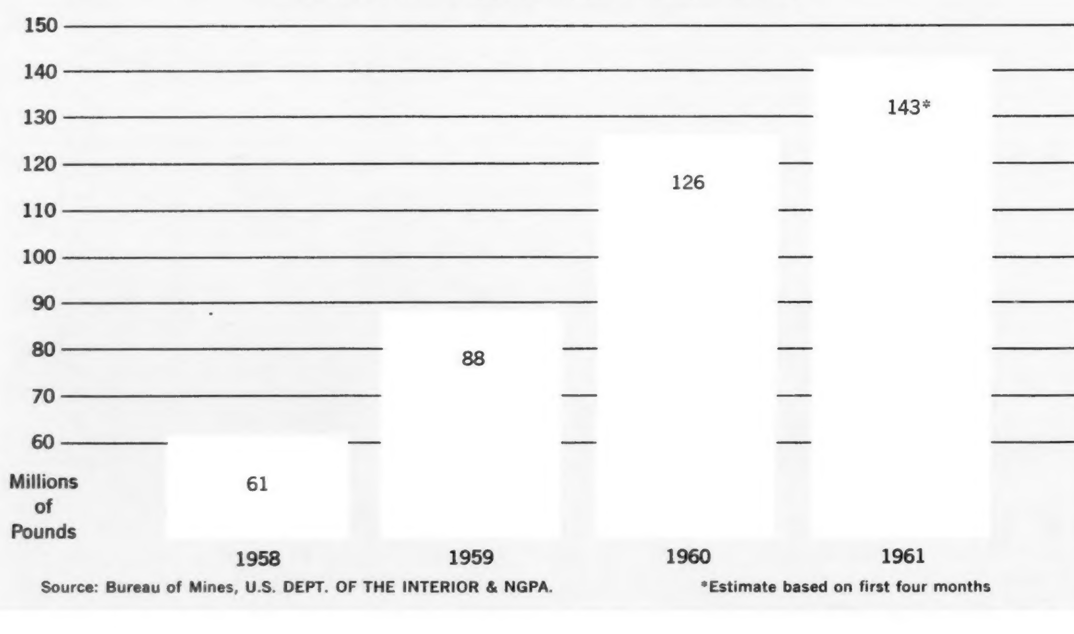
GPF Carbon Black

GPF carbon black or General Purpose Furnace Black produced by the furnace process from an oil or oil and gas base is quite distinct from any of the carbon blacks that have been reviewed to date. Actually GPF was designed to be a combination of several advantages of the then known furnace carbon blacks. It would be in order at this point to quickly review the attributes of two major furnace blacks produced prior to the advent of GPF.

The Regulars

SRF carbon black or semi-reinforcing black represented a breakthrough. It was a breakthrough from a productivity standpoint when compared with channel black. "A highly increased yield of good quality black from a given amount of hydrocarbons" was the stated purpose of an early patent covering SRF, the first black produced by the continuous furnace process.

CHARTING THE PRODUCTION COURSE OF GPF



Source: Bureau of Mines, U.S. DEPT. OF THE INTERIOR & NGPA.

*Estimate based on first four months

SRF today is still unmatched as an economical, high-loading and strengthening agent for rubber stocks. From a process standpoint, SRF carbon blacks mix coolly and easily with rubber stock even at high loadings. This carbon black has found use in every type of man-made rubber.

FEF or Fast Extrusion Furnace Black was developed for a single purpose and its name spells it out. It is unique and unequalled today as a processing aid, primarily because it is a high structure black. In fact, it has a higher degree of structure than is present in any conventional grade of rubber black. It is because of this structure that FEF assists in speeding up extrusion and retaining gauge by reducing uncured stock nerve. It also imparts excellent smoothness to tubed and calendered stocks. Basically, wherever processing characteristics are the premium requirement, FEF is a natural choice.

Each of these materials found areas where they were a star. The economical SRF provides a high loading and some degree of reinforcement. FEF is the outstanding processing aid. Furthermore, its unique properties assure truer dimensions and improved appearance in end products.

The Compounder's Carbon Black

The rubber chemist and compounder know the ability of each of the regular furnace blacks very well. They have found that in a considerable number of their formulations it was expedient to combine two, three or more carbon blacks to achieve either the economy, the surface appearance, the processibility or the reinforcement a particular application required.

Actually, there was a definite area in between SRF and FEF for the development of a carbon black which combined some of the better properties of each and which could be used as a replacement of various black combinations. GPF filled this void.

When GPF was originally developed, it received considerable attention. However, the true potential of this material has never been fully realized. To illustrate the ability of this product to replace other blacks and maintain the same property values, we have chosen a carbon black combination in two carcass compounds and matched these with GPF compounds. Test data has been run on these combinations and would seem to support the use of GPF as a replacement for these various combinations.

GPF In Action

Many medium and high quality carcass compounds contain combinations of FEF and SRF blacks. Two such compounds and their GPF counterparts are presented here:

	Good Quality Carcass Stock		Prime Quality Carcass Stock	
Compound	A	B	C	D
Natural Rubber	40	40	90	90
SBR 1500	40	40	10	10
Reclaim	40	40		
FEF	20		15	
SRF	10		10	
GPF		32.5		27.5

The ability to load an increased quantity of GPF in the compound will mean a lower volume cost. Each compounder can calculate the savings possible, based on his total ingredients and compounding costs. As this varies considerably from plant to plant, no specific cost comparisons are offered here.

After suitable preparation, the compounds indicated above were cured 45 minutes at 287°F. The following test results were obtained:

	Good Quality Carcass Stock		Prime Quality Carcass Stock	
Compound	A	B	C	D
300% Modulus	1600	1510	1130	1080
Tensile	2660	2600	3930	4060
Elongation	440	455	565	600
Durometer (Shore A)	60	60	53	53
Compound Viscosity ML-4 @ 212°F	39	38	45	42
IMS @ 260°F	23′	23′	24′	23′
Heat Build-Up, °F	38	38	19	20

Industrial Product Compounds

Many industrial product recipes originally developed for a specific product, have been adjusted again and again for other end uses. One such recipe finally contained a total of 107 parts of MPC, FEF, SRF and MT. On a direct replacement basis, 107 parts of GPF resulted in a better product and substantial savings.

This direct replacement of a combination of blacks with GPF is unique. It is realized that the normal evaluation procedure calls for comparisons at such equal loadings. However, this may not reveal the true value of GPF.

Examining the point further, it can be noted that industrial products usually call for a specific hardness level as a primary value. GPF will impart a lower hardness level to a compound than FEF when tested at equal loadings. Thus, the loading of GPF should be higher than FEF for a comparison at equal hardness.

When an equal hardness level is attained, GPF will show equal modulus, slightly lower tensile strength and slightly poorer extrusion characteristics. Such small differences can often be acceptable where economy is a prime factor.

Significant Advantages

A review of the three significant reasons for using carbon black in rubber is in order. These are, we believe, the simplest parameters available to review a particular black in comparative terms. Briefly, they are as follows:

1. Reinforcement (wear and service life)
2. Filler (economy)
3. Process aid (mixing and fabrication)

In comparative terms, GPF is unmatched in its extreme versatility of application. It offers an unusual combination of high modulus, resilience, smooth extrusion, adequate reinforcement and economy. It approaches the loading capacity of SRF and retains low hysteresis properties. On the other hand, its particle size and structure characteristics induce smoother processing and low die swell approaching that of FEF.

GPF can be used in combination with other furnace blacks as well as the channel carbon blacks.

It possesses the lowest heat built-up in combination with satisfactory viscosity, high rebound, low abrasion, high tensile strength and hot tear resistance. It has been used in tire body stocks, breaker cushions, and sidewall compounds, as well as in a variety of mechanical rubber goods applications. It offers the necessary structural reinforcement for reduced-ply tires.

A rebirth of enthusiasm for GPF seems to be kindling as the cost of inventorying and compounding multiple blacks increases. Valuable hours of the chemist or compounder are required to provide adequate supervision for plant personnel cutting into needed time for quality control and general management. When the time of key personnel is stretched too tight and basic compounding costs spiral upward, the ability of a black to replace such combinations becomes even more important.

PROPERTIES	UNITS	SRF	GPF	FEF
Surface Area	Sq. M/Gm.	19.5	31.8	39.0
Particle Dia.	Mu	160.0	98.3	80.0
Volatile Matter	%	0.74	0.07	0.91
Ash	%	0.4	0.47	0.11
pH	—	9.9	9.9	9.3
Iodine Number	Mg./Gm.	21.1	33.0	47.0
Tint Comparison	—	240.0	285.0	308.0

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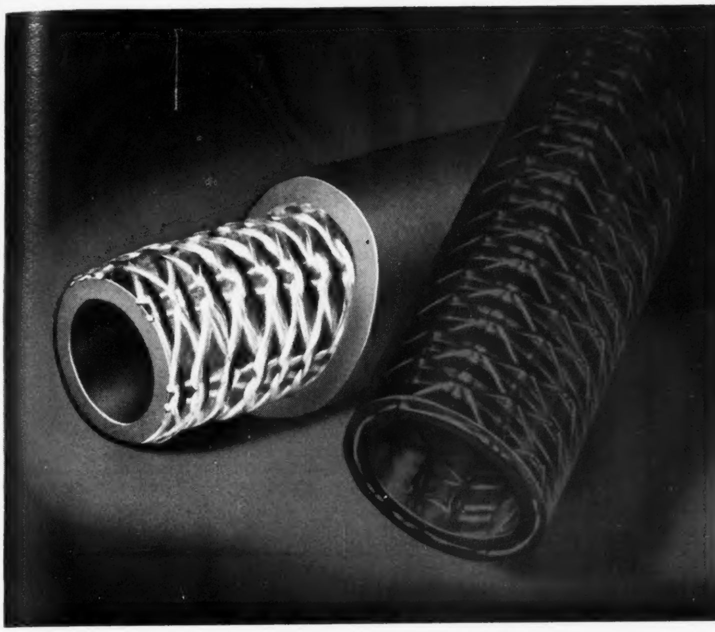

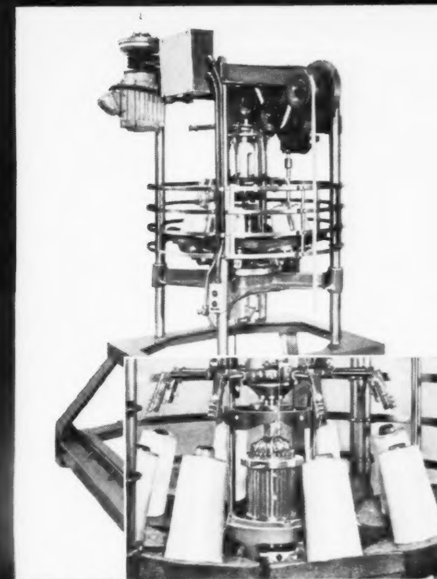

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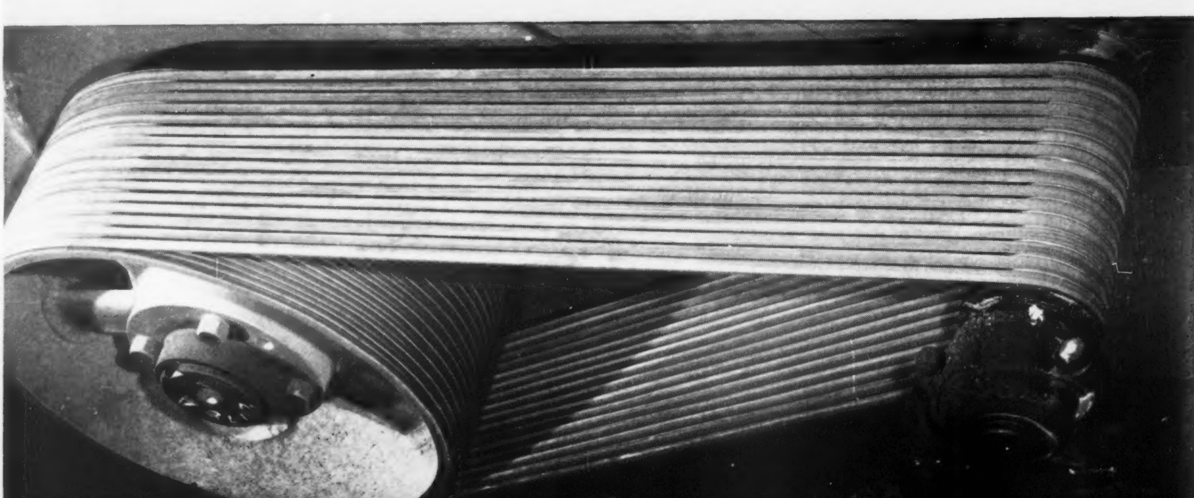

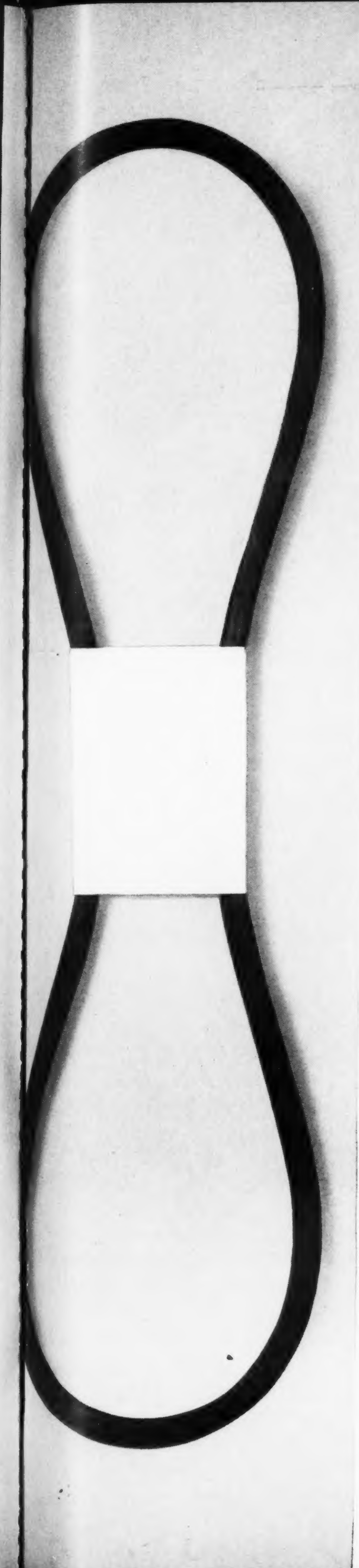

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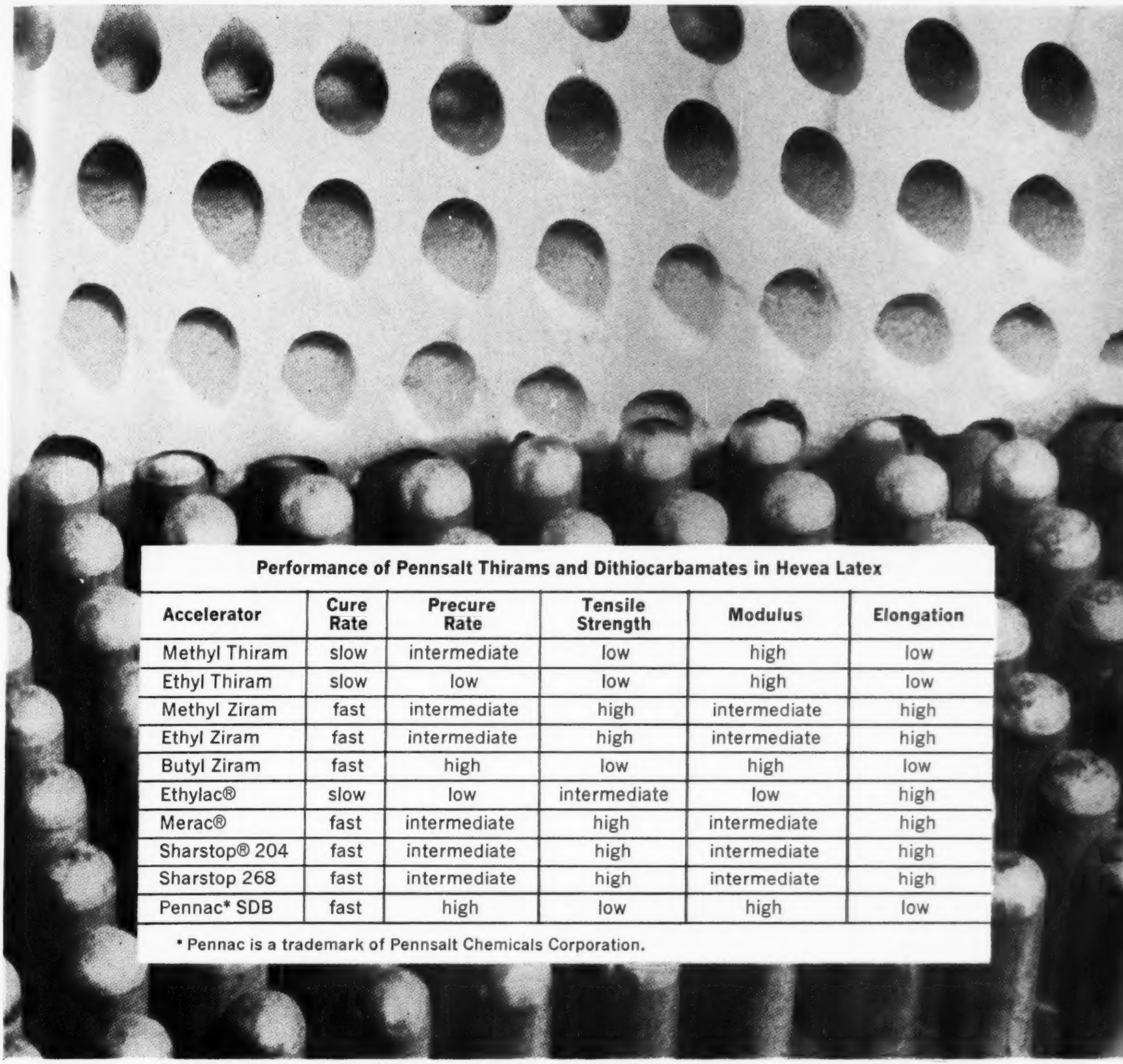

Performance of Pennsalt Thirams and Dithiocarbamates in Hevea Latex

Accelerator	Cure Rate	Precure Rate	Tensile Strength	Modulus	Elongation
Methyl Thiram	slow	intermediate	low	high	low
Ethyl Thiram	slow	low	low	high	low
Methyl Ziram	fast	intermediate	high	intermediate	high
Ethyl Ziram	fast	intermediate	high	intermediate	high
Butyl Ziram	fast	high	low	high	low
Ethylac®	slow	low	intermediate	low	high
Merac®	fast	intermediate	high	intermediate	high
Sharstop® 204	fast	intermediate	high	intermediate	high
Sharstop 268	fast	intermediate	high	intermediate	high
Pennac* SDB	fast	high	low	high	low

* Pennac is a trademark of Pennsalt Chemicals Corporation.

For customized latex accelerator systems

PENNSALT THIRAMS and DITHIOCARBAMATES

Pennsalt's continuing evaluation of latex accelerator systems now provides you with data on the effects of a wide variety of thirams and dithiocarbamates in Hevea latex. Pinpointing these effects establishes a practical foundation for pre-selection of mixed accelerator systems that provide desired processing characteristics and product properties.

Qualitative comparisons of ten accelerators are shown here. Complete results of the study, including quantitative data on physical properties and aging characteristics, are now available in Bulletin S-170. For your copy, ask your Pennsalt representative or write Industrial Chemicals Division, PENNSALT CHEMICALS CORP., Three Penn Center, Phila. 2, Pa.

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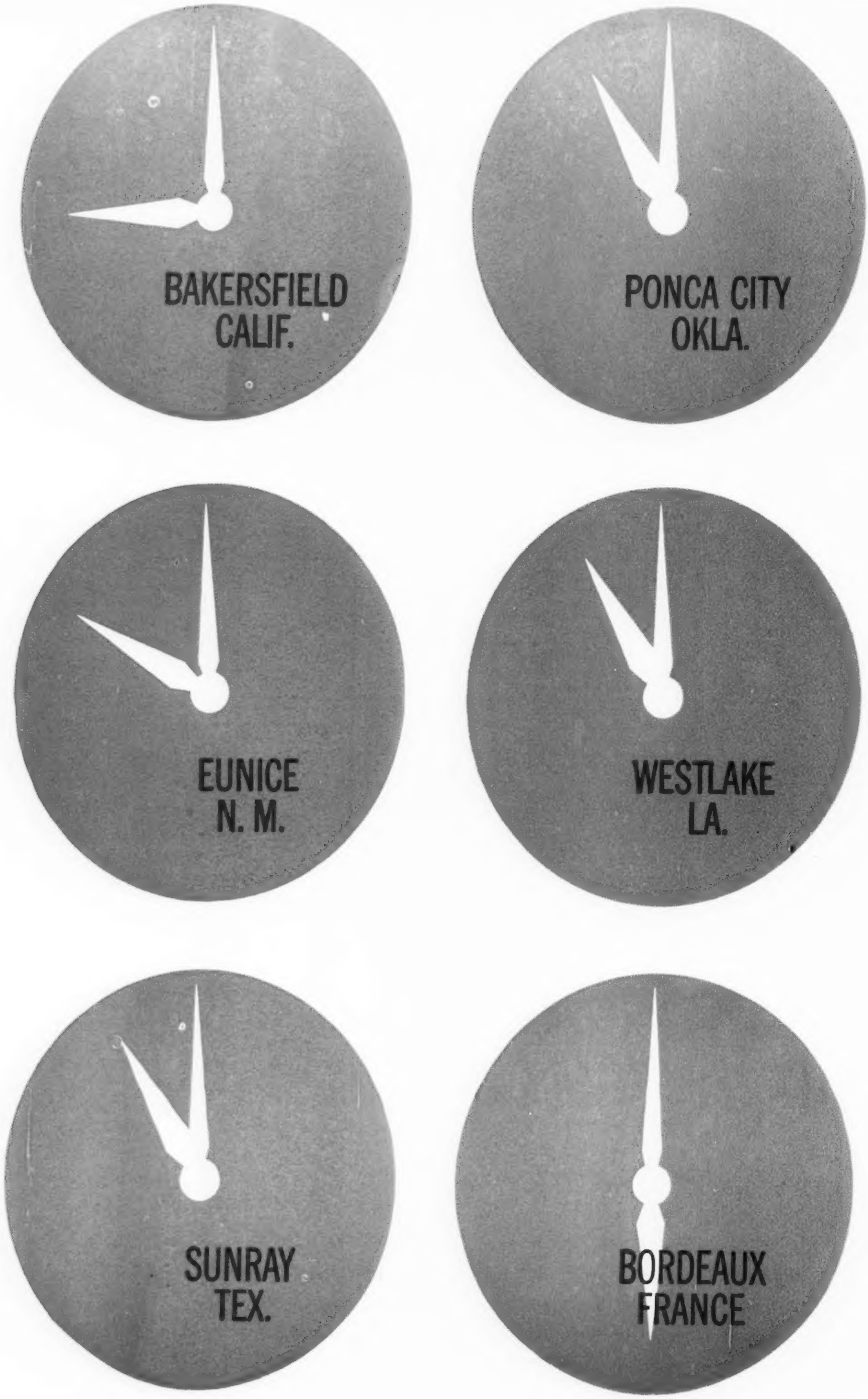

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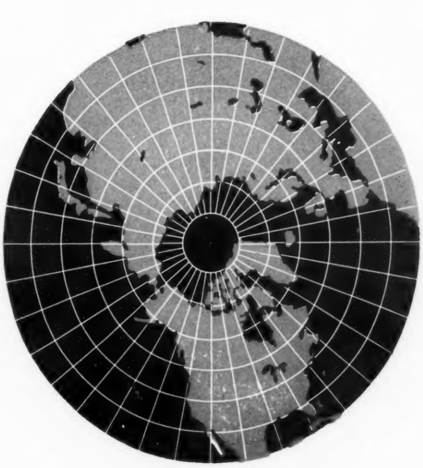

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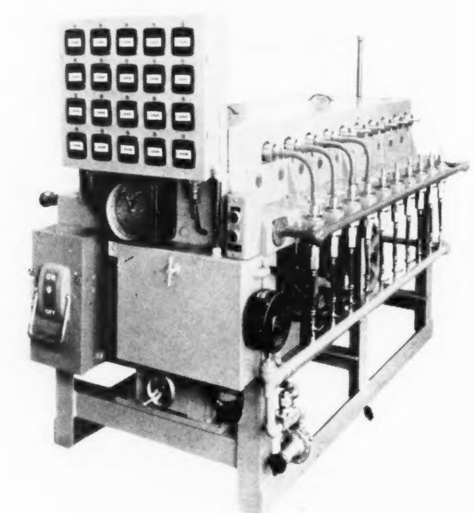
new equipment

(Continued from page 48)



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The Scott Model GTF tester features recent design improvements developed by Comptoir des Textiles Artificiels of France and is based on an original design by the Goodyear Tire & Rubber Co. to conform with ASTM Test D 885-59T.

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Holmes Introduces New Presses and Cutter

A new guillotine-type cutter for crude rubber and plastic scrap, and two improved hydraulic presses have been introduced by the Stanley H. Holmes Co., Chicago, Ill.

The guillotine cutter features a special safety operating valve which governs cutting action, and a rigidly supported removable knife blade. The machine will cut all kinds of stock, including frozen rubber.

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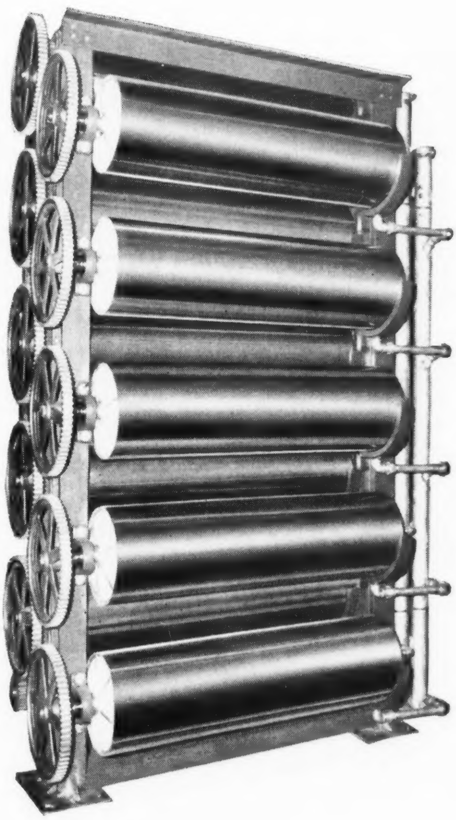

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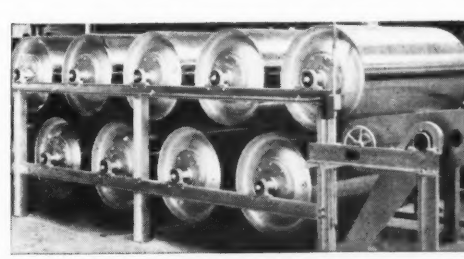

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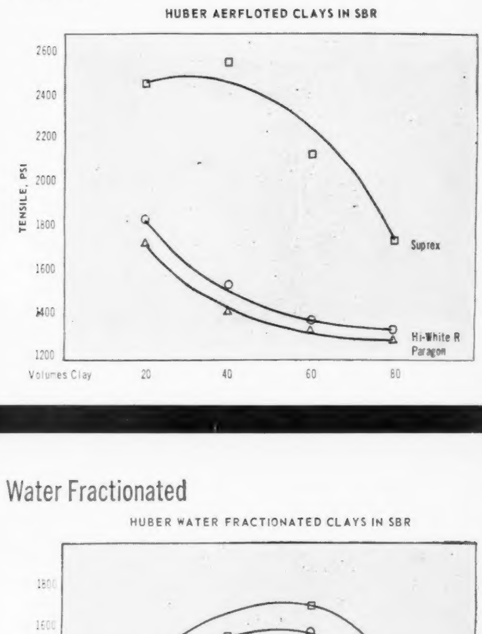
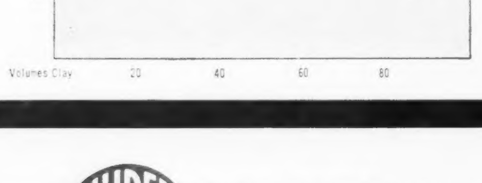
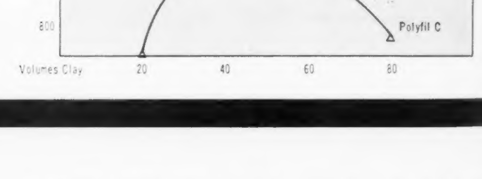


Calcined



Water Fractionated



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ORLD

editorial

Why Not Automate . . . A Little?

When the word *automation* is mentioned, most people seem to think immediately about plants operating completely without production workers, with all steps being performed by the machines under the direction of other machines. This concept would appear to rule out application in a molded goods plant, for example, where a multitude of different products are made, owing to excessive cost, if not to the complexity of the problem.

Perhaps we need to define, however, this word *automation*. As an alternate, maybe we need another word. In either event we should come up with a positive phrase indicative of our advances in the field of labor saving, labor easing, or labor efficiency. Such advances, while often saving labor, most often result in better quality and greater uniformity of product.

A simple example which comes to mind is that of a plant in which process oil is purchased in drums. This involves a lot of handling, a higher price, clerical work and losses if drum deposit is involved, and often considerable leakage. The use of a bulk storage tank which is piped right to the compounding area eliminates most of these undesirable features. This one step has thus been automated. The next step would be to run the pipe right to the mixer hopper and meter the oil to the compound. Many plants have made this type of improvement.

At a recent meeting a group of executives from molded and extruded goods companies held a round-table discussion on the subject, "The Internal Profit Squeeze." The idea of automation as a help was thrown on the table. The initial reaction was to pass this subject over as being impractical for this group. Engineering and financial resources just couldn't meet the demands of automation. One man spoke up, however, and suggested that perhaps this attitude was too negative, that a positive approach should be adopted and that the principles of automation should be utilized wherever and whenever there is an opportunity.

Let's not be scared by the word itself. If total automation is out of reach, a little automation can start the climb.

R. S. Walker

EDITOR

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Dixie Clay®
McNamee® Clay
Par Clay®
Pyrax®
Nytal®
MINERAL RUBBER
Hard Hydrocarbon
OZONE RESISTANT
Tysonite®
VINYL-RESIN STABILIZERS
Vanstay® A
Vanstay® AB
Vanstay® AC
Vanstay® CE
Vanstay® HT
Vanstay® HTA
Vanstay® HTB
Vanstay® HTC
Vanstay® HTE
Vanstay® L
Vanstay® R
Vanstay® RR
Vanstay® RRZ
Vanstay® RZ-25

ACCELERATORS
Altax®
Amax®
Amax® No. 1
Captax®
Rotax®
Bismate®
Cumate®
Ledate®
Ethyl Selenac®
Methyl Selenac®
Sulfads®
Tellurac®
Thiate® A
Thiate® B
Ethyl Tuads®
Methyl Tuads®
Unads®
Butyl Zimate®
Ethyl Zimate®
Methyl Zimate®
Butyl Eight®

ANTIOXIDANTS
AgeRite® Alba
AgeRite® DPPD
AgeRite® Gel
AgeRite® Hipar
AgeRite® HP
AgeRite® ISO
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AgeRite® Resin D
AgeRite® Spar
AgeRite® Stalite
AgeRite® Stalite S
AgeRite® Superflex
AgeRite® Superlite
AgeRite® White
AROMATIC ODORS
Rodo® No. 0
Rodo® No. 4
Rodo® No. 10
BONDING MATERIALS
Braze® Bonding Agent
Braze® H Bonding Agent
Braze® Cover Cement for Butyl
Braze® Cover Cement for Neoprene
Braze® Cover Cement for Rubber & SBR
COATING MATERIALS
VanWax®
Black-Out®
CROSSLINKING AGENT
Varox®
FUNGICIDES
Vancide® 26 EC
Vancide® 51 Z
Vancide® 89
LATEX CHEMICALS
Darvan® Dispersing Agents
Dispersed Sulfur
Butyl Namate®
Setsit® -5
Setsit® -9
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Compounding

Chlorobutyl with Other Elastomers[1]

A study to provide new and improved barriers in tubeless tires, with considerable interest to those using chlorobutyl for other uses

By J. V. FUSCO
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and

R. H. DUDLEY
Enjay Laboratories, Linden, N. J.

THERE is a need of practical inner-liner compounds which are just as effective air barriers for tubeless tires as butyl inner tubes are for tubed tires. Such an inner liner requires age resistance and air holding ability similar to those of butyl and, in addition, adhesion to unsaturated rubber carcass stocks and compatibility with them. Recently developed chlorobutyl inner-liner compounds can be shown to meet these requirements.

Historical Background

During the postwar years the air-holding and age-resisting properties of butyl rubber resulted in the wide acceptance of butyl inner tubes. The advantage in resistance to air permeability of butyl over other elastomers has been extensively discussed in the literature (1).[2] It is illustrated by the data reported by van

[1] Presented before the Division of Rubber Chemistry, ACS, New York, N. Y., Sept., 1960. Paper copyright 1960 by Enjay Chemical Co., Elizabeth, N. J.

[2] Numbers in parentheses refer to Bibliography items at end of this article.

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James V. Fusco, market development engineer, was graduated from Brown University in 1951 with a B.S. in Chemistry. He has been engaged in IIR research and development for eight years and is the holder of five patents relating to butyl and halogenated butyl rubbers.

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R. H. Dudley

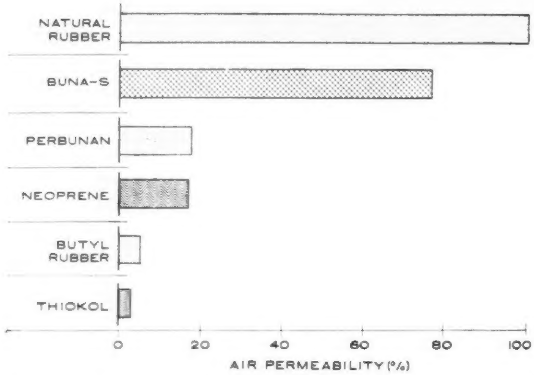
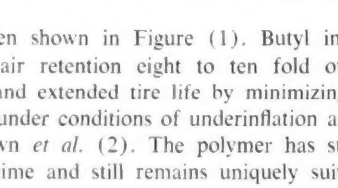


Fig. 1. Permeability of several different types of rubber to air measured at 25° C.

Amerogen shown in Figure (1). Butyl in tubes improved air retention eight to ten fold over natural rubber and extended tire life by minimizing operation of tires under conditions of underinflation as shown by Lightbown *et al.* (2). The polymer has survived the test of time and still remains uniquely suited for the application.

The last decade, however, has witnessed an evolution in pneumatic tire construction from the two-member, tire and tube, to the so-called single-member, tubeless construction. Although tubeless tire designs were under consideration as early as the beginning of the century, it was not until 1948 that B. F. Goodrich, who can be said to have pioneered this stage of development, announced its plans to market a tubeless tire. The design achieved record popularity in a short time. The role of the automobile manufacturers in promoting the changeover should not be overlooked. A large influential factor in the commercial acceptance of the tubeless tire has been the cost savings which were effected in assembly lines of automobile manufacturers.



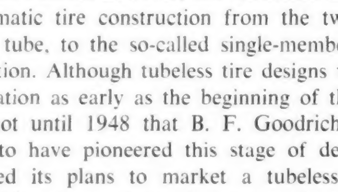


Fig. 2. Comparison of the structures of butyl and chlorobutyl rubbers showing the chlorine in an allylic position to the double bond in the molecule

Early descriptions (3, 4) of tubeless tire construction emphasized the importance of an inner liner to the performance of the tire. The inner liner completely covers the inner surface of the tire and cord and functions as an air container similar to the inner tube. These early descriptions considered butyl as essential for this inner liner to minimize air permeation into the carcass in order to reduce tire failure from ply separation.

With the inability to covulcanize butyl to SBR and natural rubber carcass vulcanizates, the industry resorted to the use of butyl reclaim and natural rubber blend compositions which could be vulcanized to the tubeless tire as a liner. Some attempts were made to modify butyl chemically with dinitroso phenol and polymethylol phenol resins to render compatibility with other elastomers (5). Such compositions have been described in liner formulations.

The most successful modification involved the halogenation of butyl rubber and was reported by Morrissey (6) in 1955. Brominated butyl was found to covulcanize readily with higher unsaturated elastomers. However, cost considerations and product quality difficulties, as they affected processing, limited its use in inner liners.

Technical improvements in the tubeless tire, such as improved cords and bonding techniques together with improved methods of construction, have led to greater consolidation of material so that separations within the carcass and between carcass and tread are less likely. Even so, the inner liner compound is still generally designed to provide maximum air retention.

The need of a butyl-type liner has persisted especially in the larger tubeless truck and off-the-road tires. Compounds capable of retaining properties after extended aging under normal operating conditions can minimize premature tubeless tire failure related to air permeation and pressure build-up in the carcass plies. This should provide a safer, more durable construction.

Chlorobutyl as a Tire Inner Liner Rubber

Permeability as Related to Structure

A new elastomer, chlorinated butyl (MD-551) (7, 8), is ideally suited for inner liner compositions. The structure of this relatively new elastomer is unique in that the chlorine is introduced into the molecule in an allylic position to the double bond. This is illustrated in Figure 2.

The preparation and structure of chlorobutyl is described by Baldwin and coworkers. During chlorination the double bond in the isoprene unit of the butyl molecule shifts from the 2, 3 position to the 1, 2 position with a chlorine addition to the allylic carbon of the double bond. The main polymer segment, polyisobutylene, is preserved. For this reason, chlorobutyl possesses all the physical and rheological properties of butyl rubber.

There are numerous references in the literature

(10-14) relating gas permeability properties with molecular structure. From such work it was concluded that the factors responsible for gas impermeability of polyisobutylene and presumably butyl and chlorobutyl are:

(1) The essentially linear nature of the principal valence chain.

(2) The moderate dimensions of the side groups on these principal chains.

Butyl and chlorobutyl have close, unstrained molecular packing which allows for maximum intermolecular bonding and consequent high interference with the diffusion of gases.

Permeability of chlorobutyl in a simple liner-type formulation together with other compounds from other elastomers designed for air retention is contained in Figure 3. These data were obtained with hydrogen gas at room temperature with a standard procedure employed by the tire industry for evaluating liner formulations. A one-pound pressure differential across a rubber membrane at room temperature is established, and the amount of gas diffusing through the membrane in 24 hours is recorded. The similarity of chlorobutyl to butyl in gas permeability is evident.

It is noteworthy that because chlorobutyl has similarly low unsaturation, it also maintains the oxidation and ozone resistance of butyl.

Advantages of Chlorobutyl

In addition to retaining many of the properties of butyl rubber, chlorobutyl possesses unique properties of its own which make it especially useful in tire inner liners. At elevated temperatures it has demonstrated excellent resistance to degradation (7, 15). The allylic nature of the chlorine in the chlorobutyl molecule gives faster cure rates and permits vulcanization with a wide variety of vulcanizing agents new to butyl. Also, chlorobutyl is compatible with the more unsaturated rubbers which are commonly used in tire carcasses. This compatibility allows for development of low-cost, practical factory compounds which combine very good age resistance, resistance to air permeability, and relatively high adhesion to present-day passenger or truck tire carcass stocks.

Versatility of Acceleration

The following series of graphs will show cure rate data with a variety of new accelerators for a butyl-type polymer and also for blends of chlorobutyl with other polymers. For convenience, the data are all in similar form with bar graphs to show tensile strength, 300% modulus and % elongation at break for cures at 287° F. for 60 minutes and 45 minutes and in some cases 30 minutes. All of the data are on a similar recipe with the following common ingredients:

Chlorobutyl (MD-551)	100
MT black	60
EPC black	20
SP-1047[3]	4
Staybelite Ester Gum #10[4]	4
Faxam 40[5] Process Oil	10
Zinc oxide	5

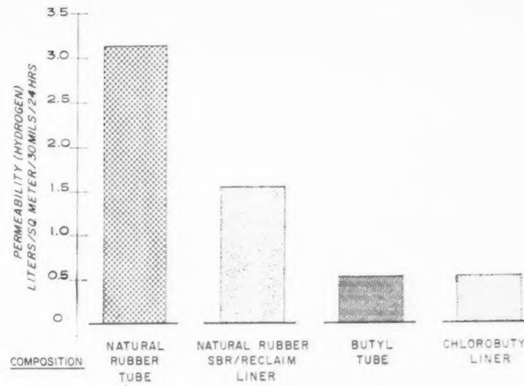


Fig. 3. Permeability of various types of rubber to hydrogen at room temperature with a one-pound pressure differential across the membrane

Data in Figure 4 show good cures in 45 and 60 minutes with a one phr concentration of each of the following accelerators, NA-22[6] (2 mercaptoimidazoline), 2MT[7] (2-mercaptothiazoline), A-1[8] (thiocarbanalide), and Retarder W[6] (salicylic acid). These compounds also contained one phr. of sulfur. The 45-minute cures have about the same tensile, modulus, and elongation as the 60-minute cures. This indicates a flat cure curve with optimum properties already reached in 45 minutes at 287° F. Figure 5 shows similar data with the same masterbatch using Permalux[6] as the accelerator with and without sulfur. Permalux is a natural rubber antioxidant, the diorthotolyl quanidine salt of dicatechol borate. It gave tight cures, as indicated by high moduli, either with or without sulfur. Although not shown in the figure, it has been found that one part of Permalux was just as effective as two phr. The control stock containing only zinc oxide and sulfur as vulcanizing agents showed lower modulus than the

[3] Trade name: Schenectady Varnish Co.
[4] Trade name: Hercules Powder Co., Inc.
[5] Reg. U. S. Pat. Off.
[6] Trade name: E. I. du Pont de Nemours & Co., Inc.
[7] Trade name: American Cyanamid Co.
[8] Trade name: Monsanto Chemical Co.

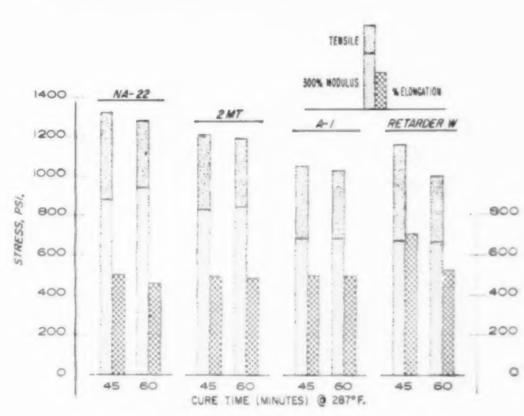


Fig. 4. Physical test data for chlorobutyl compounds containing different accelerators

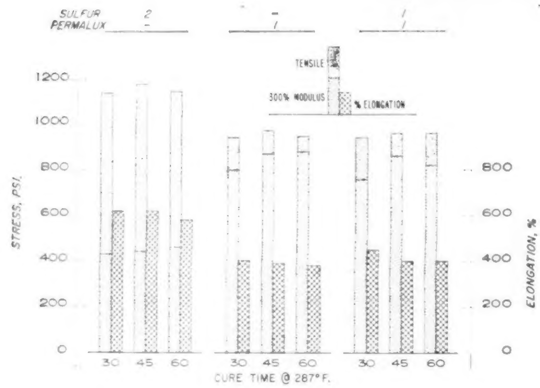


Fig. 5. Permalux cures of chlorobutyl showing compounds with and without sulfur, compared to sulfur-cured control

stocks containing Permalux, but also showed a surprisingly good cure rate with near optimum tensile strength in 30 minutes' cure at 287° F. This will be discussed further in a later section of this paper.

These stocks all gave very good adhesion to natural rubber carcass-type compounds as shown in Table 1.

TABLE 1. ADHESION OF CHLOROBUTYL COMPOUNDS TO NATURAL RUBBER CARCASS

Compound No.	1	2	3	4
Cure system:	ZnO-5	ZnO-5	ZnO-5	ZnO-5
	NA-22-1	Retarder W-1	Permalux-1	Permalux-1
	Sulfur-1	Sulfur-1	..	Sulfur-1
Carcass Adhesion, Lbs./In.:*				
At room temp.	40	80	80†	140†
250° F.	9	10	20†	40†

(*) Carcass Formulation: Smoked sheets—100; stearic acid—2.0; zinc oxide 3.0; BLE[9]—1.5; pine tar—5.0; EPC black—20; FT black—20; sulfur—2.8; Amax—0.75; Altax[10]—0.25.
(†) Stocks tore in liner.

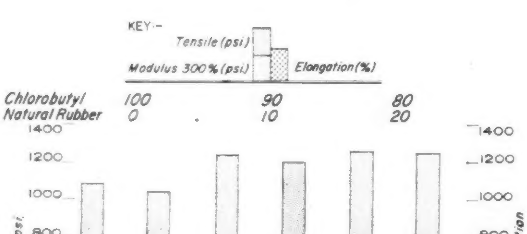


Fig. 6. Blends of chlorobutyl with natural rubber

Compatibility with Other Elastomers

The ability of chlorobutyl to covulcanize with other elastomers extends the compounding latitudes of a butyl-type rubber. Contamination problems are minimized. In some cases, blends with other elastomers may be used to take advantage of processing and/or to obtain a compromise in vulcanizate properties with the blending elastomer. Data in Figures 6, 7, and 8 illustrate stress-strain properties which can be obtained from blends with natural rubber, neoprene, and whole-tire reclaim. The same formulation was used in this work as described previously for Figures 4 and 5. The curatives consisted of: one phr. sulfur, 0.5-phr. Permalux, and one phr. of DPG which serves as an effective scorch retarder for the Permalux. The concentration of each of the different polymers was varied in the base compound.

Figure 6 shows cure properties for blends of chlorobutyl with natural rubber. It is apparent that the replacement of 10 to 20 phr. of chlorobutyl with natural rubber in this formulation had no detrimental effect on the modulus and elongation at break and improved tensile strength slightly.

Blends with Neoprene GN[6] are illustrated in Figure 7. The neoprene improved the tensile strength and substantially raised the modulus. It correspondingly decreased elongation at break. This indicates a fairly high degree of crosslinking.

The use of blends with whole-tire reclaim makes possible low-cost compounds. Such blends are illustrated in Figure 8. Stocks containing reclaim gave tensile strength, modulus, and elongation equal to, or higher than the control. Once again, a fairly high degree of compatibility is evident from these stress-strain data.

It should be noted that blending with higher unsaturated rubbers sometimes results in poorer heat aging properties. For severe heat aging requirements, 10 phr. of the other elastomer is probably the most that can be tolerated without excessive hardening and degradation on heat aging. In particular, the extensibility of these blends may decrease drastically on heat aging. Permeability is only slightly affected so long as the chlorobutyl represents the larger proportion of the blend.

It was previously shown in Figure 5 that the base compound with no accelerator gave a surprisingly good cure rate at 287° F. A possible explanation for this is contained in Figure 9, which studies tackifier variations of the previous base compound. Tackifiers such as rosin acid and its derivatives were added to a basic zinc oxide formulation to determine their effect on cure. The graph shows the effect of 5 phr. of each of the following: wood rosin, hydrogenated wood rosin, and hydrogenated rosin ester on tensile strength, modulus, and elongation at break. Wood rosin, whether hydrogenated or not, substantially decreased the time to optimum cure to 20 minutes or less, at 287° F. These rosins appear to be serving as effective activators

[9] Trade name: Naugatuck Chemical Division, United States Rubber Co.
[10] Trade name: R. T. Vanderbilt Co.

TABLE 2. PASSENGER-TIRE INNER LINER STOCKS

A	
Chlorobutyl—Natural Rubber	
Chlorobutyl	90
Smoked sheets	10
MT black	80
EPC black	20
Process oil	15
Hydrogenated rosin	8
Zinc oxide	5
Sulfur	1
DPG	1
Permalux	0.25
Stearic acid	1.0
B	
Chlorobutyl—Butyl Reclaim	
Chlorobutyl	70
Butyl tube reclaim	55
PBNA	1
GPF black	42
Stearic acid	1
Contogum B3[11]	10
Process oil	10
MBTS	1
TMTDS	0.2
Sulfur	2
MgO	1
C	
Other Rubbers	
Smoked sheets	40
Whole tire reclaim	40
SBR 1500	40
Stearic acid	1
BLE	1.5
Paraflux[12]	3
SRF black	20
FEF black	45
ZnO	5
Sulfur	2
MBTS	1.0
TMTDS	0.1

Compound	A	B	C
Permeability (X10[6]) Ft.[3] of air/1 mil/ft.[2]/24 hrs.	0.65	0.56	1.84
Carcass Adhesion, Lbs./In. at Room Temperature			
Laboratory sandwich	65	25	30
In 8.00-14 tires	19	12	21

for the zinc oxide cure. This is further substantiated by scorch data. Scorch time to a five-point plasticity rise, as measured in the Mooney plastometer at 260° F., went from greater than 30 minutes for the control to 14 minutes for the hydrogenated wood rosin and 10 minutes for the unhydrogenated wood rosin. However, compounds with this reduced scorch time have been safely processed in factory equipment. The rosin ester also activated the cure to an intermediate extent and decreased the scorch time to 26 minutes.

It may be recalled that the masterbatch discussed earlier contained hydrogenated wood rosin ester as a

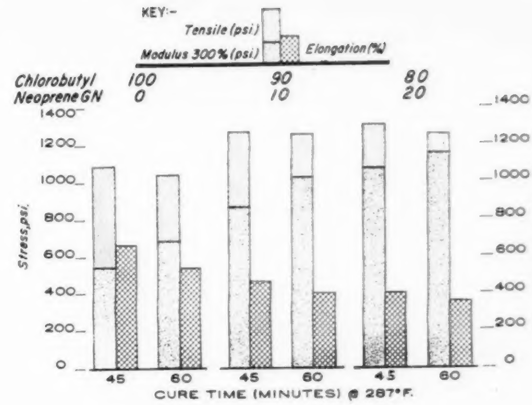


Fig. 7. Blends of chlorobutyl with neoprene

tackifier. This partly accounts for the fairly rapid cure rate of the control stock noted in Figure 5.

Inner Liner Formulations

From the broad compounding information presented, practical inner-liner formulations can now be designed from chlorobutyl to combine excellent air-holding and age-resisting qualities, compatibility with those of other rubbers, and high adhesion to them. The requirements of modern tubeless tires may vary depending on the service. This paper suggests compounding tools to meet these varied requirements. Some typical inner-liner compounds which have evolved from this work are contained in Table 2. These data compare permeability and adhesion properties of two different chlorobutyl inner-liner compounds and a tire inner liner similar to the type used today in passenger tires. Compound A contains many of the features which have been discussed in this paper. It contains a cure with Permalux and 10 phr. of natural rubber for improved adhesion. The sacrifice in permeability and aging is slight and is far outweighed by advantages in adhesion and processing. Compound B utilizes a blend of chlorobutyl and butyl reclaim for cost advantages. In

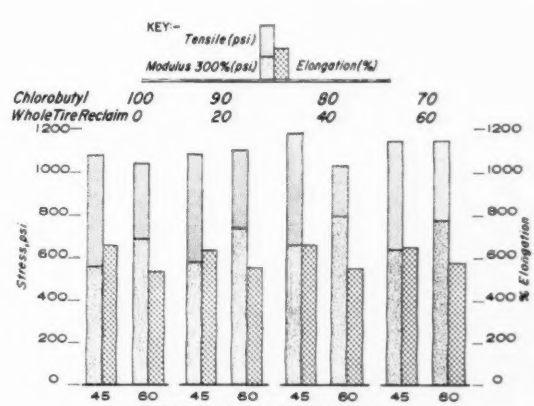


Fig. 8. Blends of chlorobutyl with whole-tire reclaim

[11] Trade name: Harwick Standard Chemical Co.
[12] Trade name: C. P. Hall Co.

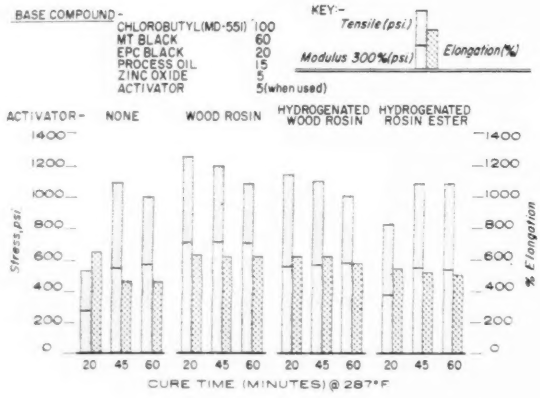


Fig. 9. Data showing activation of wood rosin and derivatives on chlorobutyl cure

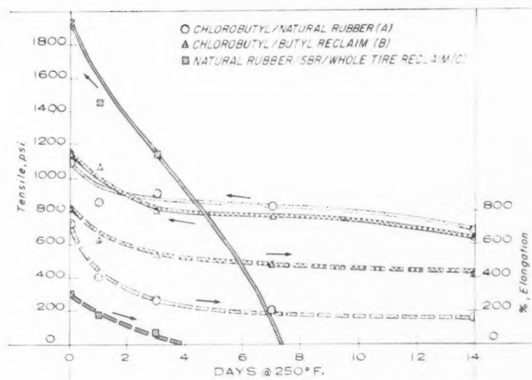


Fig. 10. Heat aging properties of tire inner liner compounds

other respects the compound uses conventional compounding techniques. Tires containing these liners have been run 25,000 miles at 70 mph. service and have survived two recappings. The liners are still performing well showing no adhesion deficiencies.

The permeability data shown in Table 2 were obtained on the Aminco-Goodrich (16) permeability tester. Permeability is measured as the number of cubic feet of air (at 32° F. and 29.92 inches of mercury) diffusing through 0.001-inch thickness of polymer under a pressure differential of one psi. per square foot of polymer per day. The data show that the chlorobutyl/butyl reclaim compound has nearly fourfold the diffusion resistance of the liner compound from unsaturated rubbers (Compound C). In comparing Compound A with B, the slight decrease in diffusion resistance of A can be related to the use of natural rubber. However, Compound A still shows about a threefold improvement in permeability resistance over the C compound, containing the unsaturated rubbers.

The aging properties of these compounds are contained in Figure 10. Stress-strain properties were measured after aging up to 14 days at 250° F. The tensile properties of the chlorobutyl compounds A and B were quite similar after aging, retaining approximately 60% of the original tensiles after the severe aging of 14 days at 250° F. The relatively poor age resistance of natural rubber is reflected in the retention of elongation after aging of Compound A, which contained 10% of natural rubber. This compound retained only 25% of its original elongation after aging in contrast to the all-butyl type compound (B) which retained 50% of its elongation after 14 days at 250° F. Compound A, however, still remained flexible and has functioned adequately in test tires with these aged properties as a liner. This does indicate that the amount of natural rubber which can be tolerated in chlorobutyl should be limited where maximum age resistance is required.

Compound C, which was formulated from unsaturated rubbers, lost 66% of its original elongation in three days and after seven days, at a temperature of 250° F., became too brittle for further tensile measurements.

Summary

In summary, the findings presented in this paper offer new and practical tools to the tire compounder for designing butyl-type, tubeless tire inner-liner formulations. Such formulations have been demonstrated with chlorobutyl as the base polymer together with blends of small amounts of natural rubber cured with a variety of accelerators new to butyl. High levels of adhesion have been obtained together with low permeability and good heat resistance. This should improve durability and safety of tubeless tires by minimizing air loss and ply separations. These results will be particularly applicable to heavy-duty tubeless tires.

Acknowledgment

The authors especially want to thank W. P. Cain, G. J. Ziarnik and J. R. Briggs, of Esso Research & Engineering Co., for much of the early work which served to guide the development as reported in this article.

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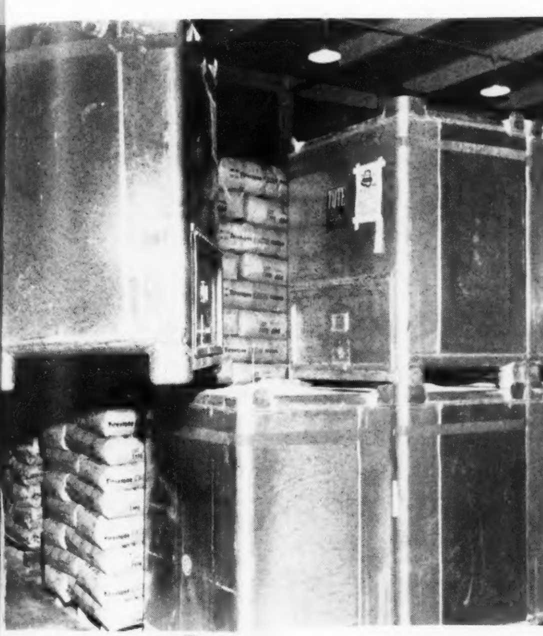
Bins Used for Shipping, Storage

Firestone finds containerized operation saves time, manpower



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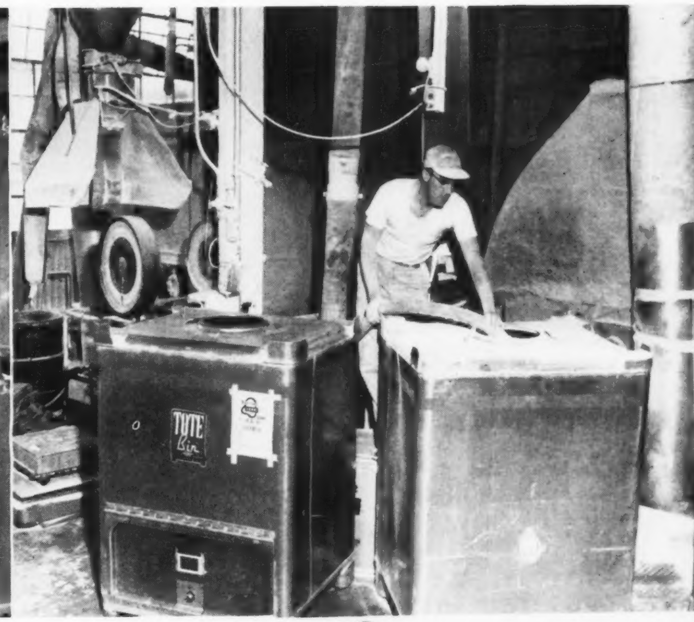

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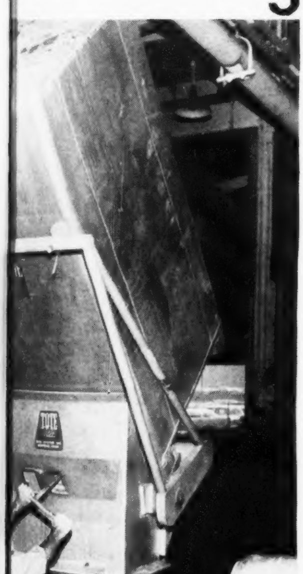

3

THE Firestone Plastics Co., Pottstown, Pa., uses containerized storage and shipping to improve ease of storage and shipping of its resins to its customers with little use of manpower.

Firestone's process, which uses the Tote Bin, product of Tote System, Inc., Beatrice, Neb., requires only one man at each end of the complete cycle of operation. Empty customer-owned 42-cubic-foot bins, some aluminum and some stainless steel, are taken from the customer warehouse by fork-lift (Figure 1) and loaded on to a flat-bed truck operated by a common carrier. The truck takes the bins to Firestone, where they are removed by fork lift, filled with resins by one man (Figure 2), and again loaded by fork lift.

At the customer plant they are removed from the truck by fork lift and either stored or discharged on a Tote Tilt (Figure 3), a discharge mechanism which tilts the bin and ejects the contents, with only one operator on the job. Bins can be stored in tiers and stacked or removed by fork lift. Very little maintenance is necessary, according to the manufacturer.

Big 74-cubic-foot aluminum bins owned by Firestone are used for storage purposes until material is dispensed into larger bulk units for customers. The customer bins can be loaded at the rate of 4,500 pounds an hour by hose, and the larger bins by screw conveyor (Figure 4). Bins can be removed, and new bins moved into position for filling within three or four minutes, the manufacturer reports.

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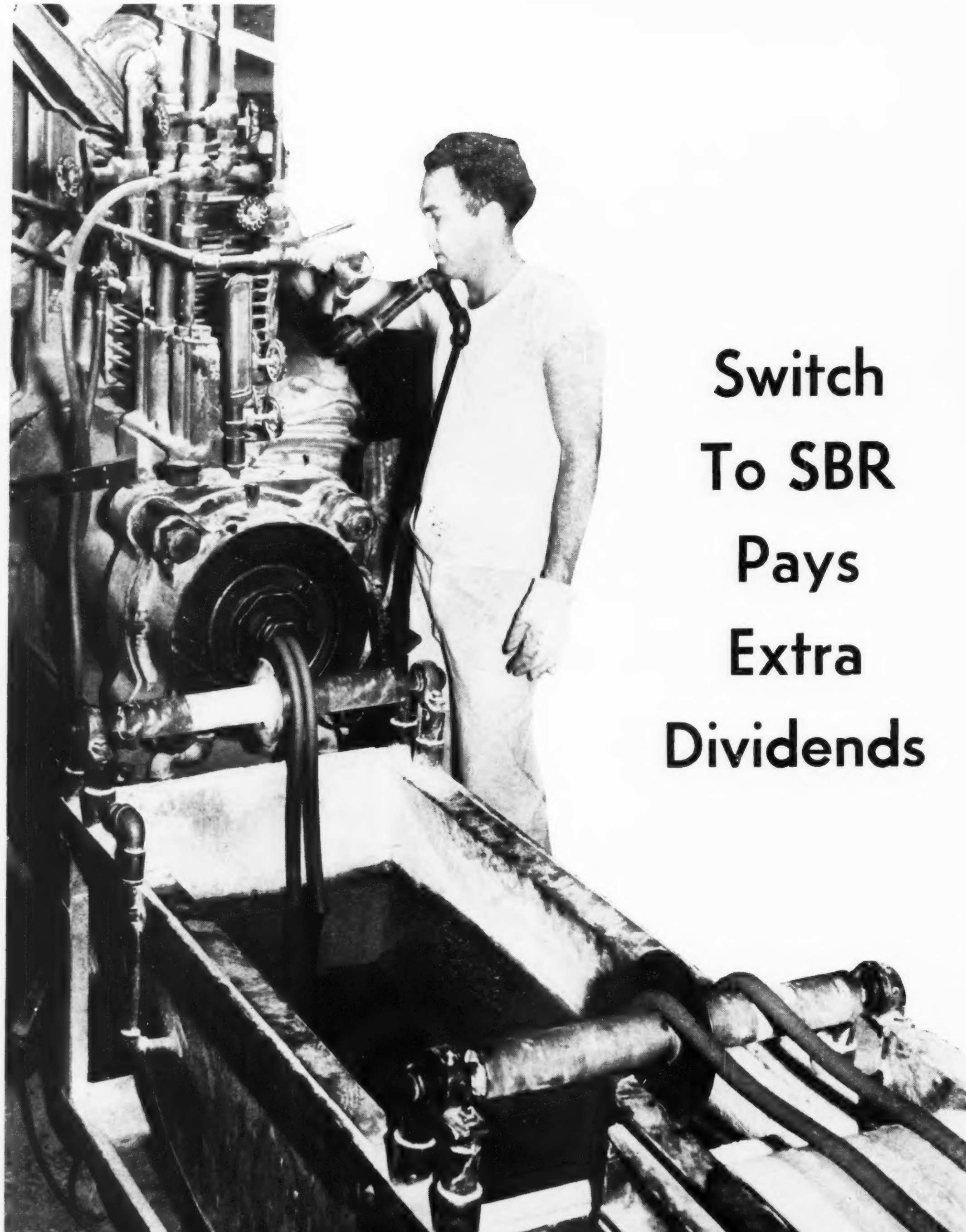
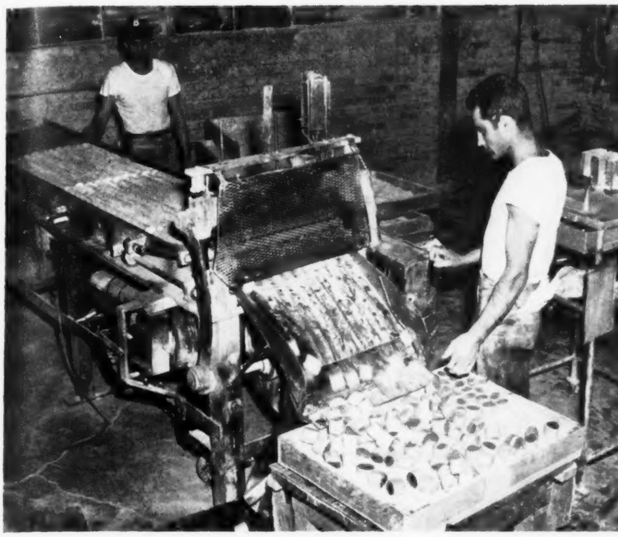


Switch To SBR Pays Extra Dividends



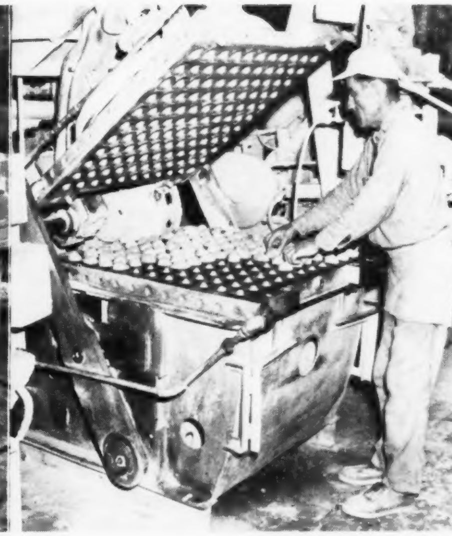


Fig. 2 (*left*). Extrusions are chopped into chunks. Fig. 3 (*right*). Chunks are placed in mold, to be cured for 29 to 90 minutes, depending on diameter of sponge ball being made

Fig. 4 (*below*). Balls are spray-painted in multi-colored patterns. Each ball gets two coats of paint and one of clear lacquer

WHEN a manufacturer of sponge rubber balls switched from natural rubber to SBR in order to cut raw material costs, the move paid unexpected dividends in lower processing costs.

A little over a year ago Barr Rubber Products Co., Sandusky, O., was feeling increasing competition from Japanese and Central European imports. One obvious possibility was to substitute a more economic material for the 4,500 pounds of natural rubber being used daily by the company.

A study was made to see whether a cheaper material could be found which would retain the physical characteristics required for sponge ball production. As a result, the company switched to Ameripol 4600, an SBR produced by Goodrich-Gulf Chemicals, Inc., Cleveland, O.

With natural rubber then priced at about 41¢ a pound, the switch cut raw material costs about 40%. As important, as far as Barr was concerned, it eliminated problems created by the wide swings in natural rubber prices, which made it very difficult to set a price on a finished proprietary item, and thus directly affected the company's ability to compete with imported sponge products.

As far as the finished sponge rubber balls were concerned, there was no major difference between natural rubber sponge and SBR sponge, Barr found. There were differences, however, in processing characteristics which made SBR definitely preferable to natural.

Here are some of the advantages of Ameripol 4600 as Barr sees them:

1. Breakdown of natural rubber is eliminated, saving mixing time and eliminating the handling of plasticized rubber.

2. Extrusion and stock preparation are easier. Die swell on extrusion is lower and more uniform.

3. SBR stock is lighter in color than the natural rubber formerly used, permitting the use of new phosphorescent paints which were not practical with natural rubber balls.

According to Barr, with natural rubber two breakdown batches made sufficient stock for three sponge compound batches. Based on 12-minute breakdown and 10-minute compound batches, elimination of breakdown batches through use of SBR has cut Banbury time 30-40%, making savings both on equipment and on

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Fig. 1 (*opposite page*). SBR stock is extruded into rods varying in diameter from ¾-inch to three inches

A Shoo-in for "Hypalon"

Synthetic rubber scores in soles and heels

A NEW, improved type of "Hypalon" compound, of particular value to the shoe industry, was recently introduced by Quabaug Rubber Co., North Brookfield, Mass. Working in conjunction with E. I. du Pont de Nemours & Co., Inc., Quabaug spent two years in the development of this material.

According to Herbert M. Varnum, development manager of Quabaug Rubber Co., "Hypalon" soles and heels are the end-product of a "continuing search for a material which would far outwear any other sole or heel on the market, and yet still be completely adaptable to current methods of shoe production within a range of reasonable economics."

"Hypalon's" durability makes it a good material for soles and heels. Quabaug feels that the 200% rating received on the National Bureau of Standards abrasion test indicates actual wear approaching three times that of conventional soling materials. Among "Hypalon's" outstanding qualities are its resistance to abrasion, low deformation in finished products, resistance to oxidation or ozone, ability to be vulcanized, and resistance to oils, greases, solvents, and other chemicals, as well as weather and moisture. Special advantages of the newly developed type of "Hypalon" compound with regard to the shoe industry are its light weight, waterproofness, ability to be stitched or cemented with standard adhesives, soft walk and heel "snap," and superior resistance to aging.

This combination of properties is expected to gain broad acceptance in boys' and men's shoes, particularly where tapered-toe, close-edge, flexible styles in cemented construction are important. A second major field is seen in quality work shoes to meet new demands for resistance to high temperatures, jet fuels, corrosive substances, or other rigorous industrial conditions. A third significant market is seen in heels for men's dress shoes which offer promise of meeting a long-term industry goal of providing heels to last the life of the shoes.

Initial response to "Hypalon" has been enthusiastic, and field evaluation has already led to adoption of the new soles by such companies as Lehigh Safety Shoe Co., Knapp Bros., Mason Shoe Mfg. Co., Huth James Shoes, Inc., and Record Industrial Co. According to Mr. Varnum, soles and heels of "Hypalon" are in a practical economic range.

"Compared with the synthetic rubber most widely used for oil resistance in shoe soles, they are only fractionally higher," he said. "Even in comparison with mass-volume synthetic shoe soles, they add only pennies to the cost of a pair of shoes."

The new products, being marketed as part of Quabaug's "Armortred" line, are available in a full range of thicknesses, including the increasingly popular low iron counts. A wide variety of colors can be manufactured. Processing in the plant is perfectly routine on standard shoe machinery, without need of special high priced equipment.

Abrasion resistance of Quabaug's new soles of "Hypalon" synthetic rubber is checked by Francis C. Rooney, board chairman *(left)*, Edward W. Varnum, president *(right)*, and Alfred Stepnowsky, chief chemist

Available Dry Synthetic Rubbers Except SBR–III[1]

Nitrile-Butadiene Rubbers (NBR) *Cont'd*

Hycar 1432

COMP: Butadiene-acrylonitrile copolymer with medium-high acrylonitrile content, and non-staining antioxidant.
SUP: B. F. Goodrich Chemical Co.
PHY PROP: Crumbs supplied in 50-lb. cartons. Sp. gr., 0.98. Mooney viscosity, 70-95. Non-staining and non-discoloring antioxidant.
PROC PROP: Cold-polymerized, directly soluble polymer.
VUL PROP: Very good oil resistance. Used in adhesives and cements, and in colorfast vinyl resin blends.

Paracril 18-80

COMP: A special grade of butadiene-acrylonitrile copolymer with a moderately staining and discoloring stabilizer. Low acrylonitrile content.
SUP: Naugatuck Chemical Div., U. S. Rubber Co.
PHY PROP: Dark-amber colored rubber supplied in 75-lb. bales. Sp. gr., 0.96. Mooney viscosity (ML-2 at 212° F.), 70-80.
PROC PROP: Slightly more difficult to process than other Paracrils. Compounded and processed in a manner similar to NR and SBR. Can be blended with most rubbers and some resins to impart special properties. Reinforcing pigments such as carbon blacks and hard clays are necessary to develop physical properties. Organic ester plasticizers enhance processing and low-temperature flexibility.
VUL PROP: Excellent low-temperature properties. Fair resistance to most fuels (aliphatic hydrocarbons) and mineral oils. Good resistance to animal and vegetable fats and oils. Medium water-absorption properties and good resistance to moderate inorganic chemicals (wet or dry). Good resistance to aging at normal and high temperatures (275-300° F.), and excellent compression set properties when vulcanized with sulfurless or low-sulfur curing systems. Good abrasion resistance. Used in mechanical goods where low-temperature properties, combined with oil and fuel resistance, are critical.

Paracril AJ

COMP: Butadiene-acrylonitrile copolymer with a non-staining and non-discoloring stabilizer. Low acrylonitrile content.
SUP: Naugatuck Chemical Div., U. S. Rubber Co.
PHY PROP: Light-amber colored rubber supplied in 75-lb. bales. Sp. gr., 0.96. Mooney viscosity (ML-2 at 212° F.), 50-60.
PROC PROP: Easy-processing, low Mooney viscosity, "hot" polymer. Compounded and processed in a manner similar to NR and SBR. Can be blended with most rubbers and some plastics to impart special properties. Reinforcing pigments such as carbon black and hard clays are incorporated easily and are necessary to develop physical properties. Organic ester plasticizers enhance processing and low-temperature flexibility.
VUL PROP: Excellent low-temperature properties, fair resistance to most fuels (aliphatic hydrocarbons) and mineral oils. Medium water absorption properties and good resistance to moderate inorganic chemicals (wet or dry). Good resistance to aging at normal and high temperatures (275-300° F.) and excellent compression set properties when vulcanized with sulfurless or low-sulfur curing systems. Good abrasion resistance. Used in general mechanical goods and sheet packing where low-temperature properties and oil and fuel resistance are needed.

Paracril ALT

COMP: Butadiene-acrylonitrile copolymer with a non-staining and non-discoloring stabilizer. Acrylonitrile content falls between contents in Paracrils BJ and AJ.
SUP: Naugatuck Chemical Div., U. S. Rubber Co.
PHY PROP: Light-amber colored rubber supplied in 75-lb. bales. Sp. gr., 0.96. Mooney viscosity (ML-2 at 212° F.), 80-90.
PROC PROP: Easy-processing and scorch resistant "cold" polymer. Compounded and processed in a manner similar to NR and SBR. Can be blended with most rubbers and some plastics to impart special properties. Reinforcing pigments such as carbon black and hard clays are incorporated easily and are necessary to develop physical properties. Organic ester plasticizers enhance processing and low-temperature flexibility.
VUL PROP: Excellent to good low-temperature properties. Fair to moderate resistance to most fuels (aliphatic hydrocarbons) and mineral oils. Low water absorption properties and good resistance to moderate inorganic chemicals (wet or dry). Good resistance to aging at normal and high temperatures (275-300° F.) and excellent compression set properties when vulcanized with sulfurless or low-sulfur curing systems. Good abrasion resistance. Used in general mechanical goods, particularly low-temperature flexible oil and fuel-resistant hose tubes requiring high reinforcing pigment contents for firm extrusions which are to be wire braided. Blended with high acrylonitrile content polymers, it improves the poorer low-temperature flexibility of the latter polymers.

[1]Continued from our June issue, p. 95.

Paracril B

COMP: Butadiene-acrylonitrile copolymer with a non-staining and non-discoloring stabilizer. Medium-low acrylonitrile content falls between contents in Paracril ALT and Paracril BLT.

SUP: Naugatuck Chemical Div., United States Rubber Co.

PHY PROP: Light-amber colored rubber supplied in 75-lb. bales. Sp. gr., 0.97. Mooney viscosity (ML-2 at 212° F.), 80-90.

PROC PROP: Processing properties are normal. Compounded and processed in a manner similar to NR and SBR. Can be blended with most rubbers and some plastics to impart special properties. Reinforcing pigments such as carbon black and hard clays are incorporated easily and are necessary to develop physical properties. Organic ester plasticizers enhance processing and low-temperature flexibility.

VUL PROP: Good low-temperature properties. Moderate resistance to most fuels (aliphatic hydrocarbons) and mineral oils. Good resistance to animal and vegetable fats and oils. Medium water absorption properties and good resistance to moderate inorganic chemicals (wet or dry). Good resistance to aging and normal and high temperatures (275-300° F.), and excellent compression set properties when vulcanized with sulfurless or low-sulfur curing systems. Good abrasion resistance. Used in mechanical goods where a balance of low-temperature properties and oil-fuel resistance is desired.

Paracril BJ

COMP: Butadiene-acrylonitrile copolymer with a non-staining and non-discoloring stabilizer. Medium-low acrylonitrile content.

SUP: Naugatuck Chemical Div., U. S. Rubber Co.

PHY PROP: Light-amber colored rubber supplied in 75-lb. bales. Sp. gr., 0.97. Mooney viscosity (ML-2 at 212° F.), 50-60.

PROC PROP: Compounded and processed in a manner similar to NR and SBR. Can be blended with most rubbers and some plastics to impart special properties. Reinforcing pigments such as carbon black and hard clays are incorporated easily and are necessary to develop physical properties. Organic ester plasticizers enhance processing and low-temperature flexibility.

VUL PROP: Good low-temperature properties. Moderate resistance to most fuels (aliphatic hydrocarbons) and mineral oils. Good resistance to animal and vegetable fats and oils. Medium water absorption properties and good resistance to moderate inorganic chemicals (wet or dry). Good resistance to aging at normal and high temperatures (275-300° F.) and excellent compression set properties when vulcanized with sulfurless or low-sulfur curing systems. Good abrasion resistance. Used where a balance of low-temperature properties and oil-fuel resistance is desired. Its easy processing properties make it an excellent non-volatile, non-migrating polymeric plasticizer for vinyl resins. Recommended for adhesives and solvent cement applications because of its excellent solution properties.

Paracril BJLT

COMP: Butadiene-acrylonitrile copolymer with a non-staining and non-discoloring stabilizer. Same medium acrylonitrile content as Paracril BLT.

SUP: Naugatuck Chemical Div., U. S. Rubber Co.

PHY PROP: Light-amber colored rubber supplied in 75-lb. bales. Sp. gr., 0.99. Mooney viscosity (ML-2 at 212° F.), 50-60.

PROC PROP: An excellent processing, scorch-resistant, low Mooney viscosity grade of BLT. Requires no breakdown to band on the mill rolls. Compounded and processed in a manner similar to NR and SBR. Can be blended with most rubbers and some plastics to impart special properties. Reinforcing pigments such as carbon black and hard clays are incorporated easily and are necessary to develop physical properties. Organic ester plasticizers enhance processing and low-temperature flexibility.

VUL PROP: Moderate low-temperature properties. Good resistance to most fuels (aliphatic hydrocarbons) and mineral oils. Excellent resistance to animal and vegetable fats and oils. Low water absorption properties and good resistance to moderate inorganic chemicals (wet or dry). Good resistance to aging at normal and high temperatures (275-300° F.) and excellent compression set properties when vulcanized with sulfurless or low-sulfur curing systems. Good abrasion resistance. Used in general molded goods where low Mooney viscosity allows for good mold flow. Permits use of higher reinforcing pigment concentrates in hose tube formulas. Excellent solution properties suggest its use for adhesives and solvent cements.

Paracril BLT

COMP: Butadiene-acrylonitrile copolymer containing a non-staining and non-discoloring stabilizer. Medium acrylonitrile content falls between contents in Paracrils B and C.

SUP: Naugatuck Chemical Div., U. S. Rubber Co.

PHY PROP: Light-amber-colored rubber supplied in 75-lb. bales. Sp. gr., 0.99. Mooney viscosity (ML-2 at 212° F.), 80-90.

PROC PROP: Easy-processing, scorch-resistant "cold" polymer. Compounded and processed in a manner similar to NR and SBR. Can be blended with most rubbers and some plastics to impart special properties. Reinforcing pigments such as carbon black and hard clays are incorporated easily and are necessary to develop physical properties. Organic ester plasticizers enhance processing and low-temperature flexibility.

VUL PROP: Moderate low-temperature properties. Good resistance to most fuels (aliphatic hydrocarbons) and mineral oils. Excellent resistance to animal and vegetable fats and oils. Low water absorption properties and good resistance to moderate inorganic chemicals (wet or dry). Good resistance to aging and normal and high temperatures (275-300° F.) and excellent compression set properties when vulcanized with sulfurless or low-sulfur curing systems. Good abrasion resistance. Good solution properties suggest its use for adhesives and solvent cements.

Paracril C

COMP: Butadiene-acrylonitrile copolymer containing a non-staining and non-discoloring stabilizer. Medium-high acrylonitrile content falls between Paracrils BLT and CLT.

SUP: Naugatuck Chemical Div., U. S. Rubber Co.

PHY PROP: Light-amber colored rubber supplied in 75-lb. bales. Sp. gr., 0.99. Mooney viscosity (ML-2 at 212° F.), 80-90.

PROC PROP: Processing properties similar to Paracril B. Compounded and processed in a manner similar to NR and SBR. Can be blended with most rubbers and some plastics to impart special properties. Reinforcing pigments such as carbon black and hard clays are incorporated easily and are necessary to develop physical properties. Organic ester plasticizers enhance processing and low-temperature flexibility.

VUL PROP: Fair low-temperature properties. Good resistance to most fuels (aliphatic hydrocarbons) and mineral oils. Excellent resistance to animal and vegetable fats and oils. Medium water absorption properties and good resistance to moderate inorganic chemicals (wet or dry). Good resistance to aging at normal and high temperatures (275-300° F.) and excellent compression set properties when vulcanized with sulfurless or low-sulfur curing systems. Very good abrasion resistance. Used where low-temperature flexibility is unimportant, but good oil resistance is necessary.

Paracril CLT

COMP: Butadiene-acrylonitrile copolymer with a non-staining and non-discoloring stabilizer. High acrylonitrile content falls between Paracrils C and D.

SUP: Naugatuck Chemical Div., U. S. Rubber Co.

PHY PROP: Light-amber colored rubber supplied in 75-lb. bales. Sp. gr., 1.01. Mooney viscosity (ML-2 at 212° F.), 80-90.

PROC PROP: An easy-processing, scorch-resistant "cold" polymer. Compounded and processed in a manner similar to NR and SBR. Can be blended with most rubbers and some plastics to impart special properties. Reinforcing pigments such as carbon black and hard clays are incorporated easily and are necessary to develop physical properties. Organic ester plasticizers enhance processing and low-temperature flexibility.

VUL PROP: Very good resistance to most fuels (aliphatic hydrocarbons) and mineral oils. Excellent resistance to animal and vegetable fats and oils and diester oils and lubricants. Low water absorption properties and good resistance to moderate inorganic chemicals (wet or dry). Good resistance to aging at normal and high temperatures (275-300° F.), and excellent compression set properties when vulcanized with sulfurless or low-sulfur curing systems. Very good abrasion resistance. Poor low-temperature properties. Good solution and film strength properties suggest its use in structural adhesives.

Paracril CV

COMP: Butadiene-acrylonitrile copolymer with a non-staining and non-discoloring stabilizer. Medium-high acrylonitrile content is same as in Paracril C.

SUP: Naugatuck Chemical Div., U. S. Rubber Co.

PHY PROP: Light-amber-colored rubber supplied in crumb form in 75-lb. packages. Sp. gr., 1.00. Mooney viscosity (ML-2 at 212° F.), 75-85. To prevent massing, the crumbs are dusted with vinyl resin which is soluble in common NBR solvents.

PROC PROP: Readily solvated in ketones and aromatic and chlorinated hydrocarbon solvents without the necessity of prior breakdown since it is gel free and the crumb has a large surface area. In adhesive formulations, is generally compounded with various resins.

VUL PROP: The easy solvation, excellent viscosity stability during storage, high cohesion strength, and excellent adhesion properties, when modified with phenolic resins, make it a good base in the formulation of adhesives. The crumb form allows its use in dry blending with phenolics, vinyls, and styrenes for compounding high-impact plastic materials.

Paracril D

COMP: Butadiene-acrylonitrile copolymer with a non-staining and non-discoloring stabilizer. Highest acrylonitrile content of all Paracrils.

SUP: Naugatuck Chemical Div., U. S. Rubber Co.

PHY PROP: Light-amber-colored rubber supplied in 75-lb. bales. Sp. gr., 1.02. Mooney viscosity (ML-2 at 212° F.), 50-60.

PROC PROP: Easy-processing "hot" polymer with low Mooney viscosity. Compounded and processed in a manner similar to NR and SBR. Can be blended with most rubbers and some plastics to impart special properties. Reinforcing pigments such as carbon black and hard clays are incorporated easily and are necessary to develop physical properties. Organic ester plasticizers enhance processing and low-temperature flexibility.

VUL PROP: Gas permeation resistance is excellent. Excellent resistance to most fuels (aliphatic hydrocarbons) and mineral oils. Excellent resistance to animal and vegetable fats and oils. Good resistance to aromatic fuels and oils, diester lubricants, and some chlorinated hydrocarbons. Medium water absorption properties and good resistance to moderate inorganic chemicals (wet or dry). Good resistance to aging and normal and high temperatures (275-300° F.) and excellent compression set properties when vulcanized with sulfurless or low-sulfur curing systems. Very good abrasion resistance. Poor low-temperature properties.

Paracril OZO

COMP: A fluxed blend of a Paracril and a Marvinol vinyl resin with non-staining and non-discoloring stabilizers for both components.

SUP: Naugatuck Chemical Div., U. S. Rubber Co.

PHY PROP: Light-amber-colored rubber supplied in flake form in 50-lb. packages. Sp. gr., 1.065. Mooney viscosity (ML-2 at 212° F.), 70-90.

PROC PROP: Compounds can be easily processed and have good scorch resistance. Compounded and processed in a manner similar to NR

and SBR. Can be blended with most rubbers and some plastics. Pigments such as carbon black, hydrated silica, and hard clays give reinforcement; while soft clays and natural whitings are useful as diluents to improve processing and reduce compound costs. Organic ester plasticizers enhance processing and low-temperature flexibility.

VUL PROP: Vulcanizates retain the excellent "rubber" qualities (high physicals, high abrasion resistance, good oil-fuel resistance). In addition they have excellent ozone resistance or resistance to outdoor weathering, and very good retention of color after exposure to outdoor light. Has minimized plasticizer migration and good flame resistance. Allows the compounder to design compounds with bright permanent colors.

Polysar Krynac 800

COMP: Butadiene-acrylonitrile copolymer with a medium level of acrylonitrile. A "cold" rubber containing a relatively non-discoloring, non-staining stabilizer.
SUP: Polymer Corp., Ltd.
PHY PROP: Raw polymer Mooney viscosity (ML-4' at 212° F.) about 83.
PROC PROP: Very good processability.
VUL PROP: General-purpose uses. Used in oil seals and gaskets, oil, gasoline and compressed air hose tubes, miscellaneous molded, extruded, and calendered goods, conveyor and transmission belt covers, and others.

Polysar Krynac 801

COMP: Butadiene-acrylonitrile "cold" polymerized rubber with high acrylonitrile content. Contains a relatively non-discoloring and non-staining stabilizer.
SUP: Polymer Corp., Ltd.
PHY PROP: Raw polymer Mooney viscosity (ML-4' at 212° F.), about 83.
PROC PROP: Very good processability.
VUL PROP: High oil resistance. Used where maximum oil resistance is needed; good for O-rings and gasoline hose tubes.

Polysar Krynac 802

COMP: Butadiene-acrylonitrile "cold" polymerized rubber, with a low level of acrylonitrile. Contains a relatively non-discoloring, non-staining stabilizer.
SUP: Polymer Corp., Ltd.
PHY PROP: Raw polymer Mooney viscosity (ML-4' at 212° F.) about 83.
PROC PROP: Very good processability.
VUL PROP: Has better low-temperature properties, but is somewhat less oil resistant than Polysar Krynac 800. Used in molded, extruded, or calendered oil-resistant goods which must have good flexibility at low temperatures.

Polysar Krynac 803

COMP: Butadiene-acrylonitrile "cold" polymerized rubber with a medium level of acrylonitrile, and relatively non-discoloring, non-staining stabilizer. Low Mooney viscosity.
SUP: Polymer Corp., Ltd.
PHY PROP: Raw polymer Mooney viscosity (ML-4' at 212° F.) about 47.
PROC PROP: Easy-processing, low-viscosity compounds. Needs no extensive prior breakdown.
VUL PROP: General purpose. Also suitable for those applications where no plasticizer can be tolerated or where a high filler load at low plasticizer level with minimum processing difficulties is desired.

Polysar Krynac XPRD

COMP: Non-staining terpolymer of acrylonitrile, butadiene, and divinyl benzene.
SUP: Polymer Corp., Ltd.
PHY PROP: Raw polymer Mooney viscosity (ML-4' at 212° F.), about 60.
PROC PROP: Substitution of this for part of the elastomer in NBR compounds reduces nerve and shrinkage and improves calendering and extrusion properties. Cross-linked for low shrinkage and easy processing.

Polyisobutylene

Vistanex LM-MH

COMP: Polyisobutylene.
SUP: Enjay Chemical Co.
PHY PROP: Viscous tacky semi-solid. Sp. gr., 0.92. Color, white to pale yellow. It is LM (low molecular weight) with viscosity average molecular weight (Staudinger) 10,000-11,700 and is classified MH (medium hard.) Packaged in steel drums of 100 lbs.
PROC PROP: Blends readily with oils, waxes, solvents, and with other polymers. Handled like other viscous tacky materials, using heavy-duty sigma-bladed mixers.
VUL PROP: It is not vulcanizable by itself. It is used to impart special properties of vulcanized compounds to other elastomers and NR. Also used in unvulcanized compositions alone or in combination with other materials. Imparts good electrical properties, chemical inertness, high ozone resistance, low gas permeability, excellent aging and high degree of tackiness to compounds. Uses include cable insulation, pressure-sensitive tapes and adhesives, and calking and sealing compounds.

Vistanex LM-MS

COMP: Polyisobutylene.
SUP: Enjay Chemical Co.
PHY PROP: Viscous tacky semi-solid. Sp. gr., 0.92. Color, white to pale yellow. It is LM (low molecular weight) with viscosity average molecular weight (Staudinger) 8,700-10,000 and is classified MS (medium soft.) Packaged in steel drums of 100 lbs.
PROC PROP: Same as Vistanex LM-MH.
VUL PROP: Same as Vistanex LM-MH.

Vistanex MM L-80

COMP: Polyisobutylene.
SUP: Enjay Chemical Co.
PHY PROP: Tough rubbery solid. Sp. gr., 0.92. Color, white to pale yellow. It is MM (medium molecular weight) with viscosity average molecular weight (Staudinger) 64,000-

81,000. It contains less than 0.3 wt. % inhibitor. Packaged in heavy boxboard cartons of about 50 lbs.

PROC PROP: It can be milled, kneaded, or masticated in internal mixers for compounding and mixing with other materials, and sheeted out for addition to solvents. It cannot be extruded or calendered uncompounded. It breaks down on milling and should be mixed at between 250-300° F.

VUL PROP: It resembles NR in tensile strength, elasticity, rebound at elevated temperatures, elastic memory, electrical properties, fractional solubility, and mechanical orientation. Because it is essentially saturated hydrocarbons, it is more resistant to heat, light, chemical attack, and mechanical working than ordinary rubber.

Vistanex MM L-100

COMP: Polyisobutylene.
SUP: Enjay Chemical Co.
PHY PROP: Tough rubbery solid. Sp. gr., 0.92. Color, white to pale yellow. It is MM (medium molecular weight) with viscosity average molecular weight (Staudinger) 81,000-99,000. It contains less than 0.3 wt. % inhibitor. Packaged in heavy boxboard cartons of about 50 lbs.
PROC PROP: Same as Vistanex MM L-80.
VUL PROP: Same as Vistanex MM L-80.

Vistanex MM L-120

COMP: Polyisobutylene.
SUP: Enjay Chemical Co.
PHY PROP: Tough rubbery solid. Sp. gr., 0.92. Color, white to pale yellow. It is MM (medium molecular weight) with viscosity average molecular weight (Staudinger) 99,000-117,000. It contains less than 0.3 wt. % inhibitor. Packaged in heavy boxboard cartons of about 50 lbs.
PROC PROP: Same as Vistanex MM L-80.
VUL PROP: Same as Vistanex MM L-80.

Vistanex MM L-140

COMP: Polyisobutylene.
SUP: Enjay Chemical Co.
PHY PROP: Tough rubbery solid. Sp. gr., 0.92. Color, white to pale yellow. It is MM (medium molecular weight) with viscosity average molecular weight (Staudinger) 117,000-135,000. It contains less than 0.3 wt. % inhibitor. Packaged in heavy boxboard cartons of about 50 lbs.
PROC PROP: Same as Vistanex MM L-80.
VUL PROP: Same as Vistanex MM L-80.

(To be continued)

Switch to SBR

(Continued from page 75)

the five men operating the Banbury.

Since SBR is produced to a controlled viscosity, the switch to synthetic has simplified laboratory control. Formerly as many as 30 batches of natural rubber were processed daily, and lab evaluations for plasticity frequently showed that a batch would have to be remilled before it could be used, Barr notes. A considerable amount of lab work was needed to adjust recipes for work-away of bad batches. With SBR, since there are no "out of spec" batches, work-away is eliminated, Barr says.

Barr also notes that in switching from natural rubber to SBR, only slight changes have been necessary in production techniques, and no major equipment modifications were necessary.

After the compound leaves the Banbury in the form of round rolls, it is placed on trucks for 24 hours to age. It is then extruded into rods, varying in diameter from ¾-inch to three inches, depending on the size of the sponge ball to be produced. These rods are chopped into small chunks, and one chunk is placed in each cup of the curing mold.

Cure rate must be carefully controlled so that the ball "blows" to its required diameter before the cure is complete. Cure temperature ranges from 307 to 320°F., and time of cure from 20 minutes to 1½ hours, depending on the diameter of the final product.

Balls then move to one of several paint lines, where they are given two coats of paint and one of clear lacquer, drying under heat between coats. Solid, mottled, and multi-colored patterns are used on the balls.

In all, the company turns out an average of slightly more than five tons of sponge rubber products a day, and as many as a million sponge balls can be produced in a week.

Barr Rubber Products Co.'s sponge products include colored balls ranging in diameter from ¾-inch to three inches, children's "Big League" rubber baseballs, paddle balls, and rubber golf balls. The company's product line also includes basketballs, footballs, and volley balls as well as custom mechanical goods for the automotive industry.

Rayon Used for Hose Fabric

Economy and strength are the two primary reasons why the Unity Plant of Callaway Mills, La Grange, Ga., has selected rayon for the manufacture of wrapped hose fabrics and other industrial applications.

Callaway choose XL-I rayon, made by American Viscose Corp., because it is fiber having the desired physical properties which directly help the cost and the performance of wrapped hose. The cost of this fiber is low, thus contributing to production economy. Lighter and stronger constructions can be engineered with XL-I rayon, which have, in addition to high wet strength, greater fatigue and flex life, good adhesion, and ability to absorb shock loads.

This unit of Callaway is devoted entirely to the production of industrial fabrics for the rubber industry. These fabrics are used in such items as dredging, water, and aviation hose as well as tire products.

meetings and reports

Collier, Allen, of Committee D-11, Get ASTM Awards at Atlantic City

Simon Collier, chairman of Committee D-11, Rubber and Rubber-Like Materials, received an honorary membership in the American Society for Testing Materials, and John J. Allen, D-11 secretary, received the ASTM Award of Merit, at the annual ASTM meeting in Atlantic City, N. J., June 26-30.

Collier, a quality control consultant, has been chairman of Committee D-11 since 1946. Allen, member of the general research management staff of Firestone Tire & Rubber Co., Akron, O., and a member of the RUBBER WORLD advisory board, has been secretary of D-11 since 1958.

Collier's award was made at the President's Luncheon, June 27, and Allen's at the Awards Luncheon, June 28.

Committee D-11 met on the morning of June 30, with Collier presiding and Allen assisting.

A program committee headed by A. E. Juve, B. F. Goodrich Co., assisted by Rolla Taylor, Scott Testers, Inc., was appointed to arrange for celebration of the fiftieth anniversary of the formation of Committee D-11, to be held in connection with the 1962 annual meeting of ASTM the week of June 24-29 in New York. The joint Technical Committee on Automotive Rubber of the ASTM and the Society of Automotive Engineers will be invited to join with Committee D-11 in the celebration.

Committee D-11 voted to meet with the ASTM during Committee Week, February 5-9, 1962, in Dallas, Tex.

ASTM headquarters and R. D. Stiehler, National Bureau of Standards and chairman of the American delegation to the International Standards Organization/Technical Committee 45 on Rubber, requested that Committee D-24 on Carbon Black be represented on ISO/TC 45, and it was decided that whenever there are matters of interest to Committee D-24 at the ISO/TC 45 meetings, one or two members of Committee D-24 will be included in the Committee D-11 delegation.

Changes in the chairmanships of four subcommittees and one task group were announced. L. A. Wohler, Firestone, has resigned as chairman of Subcommittee 22 on Flexible Cellular Materials, and T. H. Rogers, Goodyear Tire & Rubber Co., has been appointed to replace him. W. C. L. Tenbrook, Goodyear, succeeds Wohler as chairman of the task group of rubber latex producers. O. W. Lundstedt, United States Rubber Co., replaced Rogers as chairman of Subcommittee 7 on Rubber Latices. John T. Blake, Simplex Wire & Cable Co., has resigned as chairman of Subcommittee 5 on Wire and Cable, and E. G. Driscoll, Habirshaw Wire & Cable Division, Phelps Dodge Copper Products Corp., replaces him. R. G. Seaman, RUBBER WORLD, has resigned as chairman of Subcommittee 8 on Nomenclature and Definitions.

It was announced that ASTM recently published a book of recommendations on the proper form to be followed in writing ASTM standards. The booklet, "Specifications, Methods of Test—Notes, References, Illustrations, Units of Measurement," will be distributed to subcommittee chairmen.

The annual report of Committee D-11, with revisions resulting from the Atlantic City meeting, was approved for presentation to the ASTM.

Prior to the business meeting Roy H. Moult, of the resins and adhesives group of the research department of Koppers Co., and William I. Martin, of the research department's mathematics group, presented a paper on evaluation of the H-test method for adhesion of tire cord to rubber.

Subcommittee meetings were held June 28 and 29. The advisory committee meeting took place June 27, and the Committee D-11 dinner, June 29.

Tire Cord Adhesion Test

Moult and Martin, presenting their paper on tire cord adhesion testing, were introduced by H. G. Bimmerman, E. I. du Pont de Nemours & Co., Inc., vice chairman of D-11 and chairman of its program committee. Moult, a senior scientist at Koppers Co., presented the overall findings contained in the paper, and Martin, a statistician, presented a statistical analysis of the test.

Moult explained that the H-test, in which two small blocks of rubber joined by an interconnecting cord and pulled apart by means of two hook-type clamps in order to effect rupture, has been widely used in the past, but modifications by various groups have led to a general lack of agreement on conditions of the test; therefore we have the widely held opinion that the test is unreliable.

As a result of observing variations under varied test conditions, it was decided to standardize test conditions along the following lines, he said: a ¼-inch wide specimen mold; test clamp speeed of six inches a minute; specimens preheated 15 minutes at 232° F.; temperature at break, 212° F.; 60-mil clamp slot size; specimens molded on one day, tested on the next.

The decision was made after tests showed that width of mold, speed of clamps, temperature of specimens, clamp slot size, and aging all affected test results.

After standardizing these conditions it was found that variations in results were found between specimens in the top row of a mold and those in the bottom row, between the various cord slots, among the cord samples along the length of the 1,200-foot dipped tire cord, and between moldings made within a single day as well as on different days, Martin noted.

He explained that it was found that the test would detect differences between two tire cord dips which gave differences in test results averaging more than 1.70 for rayon cord and 1.65 for nylon cord. He next discussed the statistical methods used to arrive at this result.

Martin pointed out that the study had been made in one laboratory, using one molding press and one tester. In order to improve the study from a statistical point of view, it should be extended to other laboratories, personnel, and equipment, he said.

The study was the outgrowth of work done by a task group of Subcommittee 21 of Committee D-11 on the problem of static adhesion of textile cords to rubber, and research by Koppers Co. on developing improved resorcinol-for-

maldehyde adhesives for tire cord-rubber bonding.

Subcommittee Reports

Subcommittee 4—Protective Equipment for Electrical Workers. Gordon Thompson, Electrical Testing Laboratories, Inc., chairman. The subcommittee reapproved standards D 1049-59, rubber insulating hoods; D 1050-59, rubber insulating line hose; D 178-24, rubber clothing for use around electrical apparatus.

The subcommittee approved advancing D 120-59T, rubber insulating gloves, to standard status, recommended it to the American Standards Association as an American standard, and voted to retain D 1700-59T, low-voltage rubber insulating gloves, as a tentative. It reapproved D 1948-59, rubber insulating blankets, and D 1051-59, rubber insulating sleeves, as standards, voting to refer proposals for several revisions of each of the two standards to the proper sections of the subcommitte for study and recommendation.

Subcommittee 5—Wire and Cable. John T. Blake, chairman. The subcommittee approved letter-ballots on five standards. These included revisions of D 1351-54T on polyethylene insulation; a new specification for a 60° C. poly-(vinyl chloride) insulation to replace D 734-60, which the subcommittee voted to withdraw; a new specification for a 75° C. PVC insulation; and new aging tests for D 752-60 heavy-duty black neoprene sheath for wire and cable; and D 753-60, general-purpose neoprene sheath for wire and cable.

The subcommittee voted to coordinate neoprene aging tests in Subcommittee 5 specifications with developments in Subcommittee 15. It also recommended that conflicts in meeting times of Subcommittees 5 and 15 be avoided if possible.

E. G. Driscoll was appointed to succeed Blake, who resigned as chairman of the subcommittee, and C. W. Pickells, Consolidated Edison Co. of New York, has resigned as chairman of the test section.

Subcommittee 6—Packings. R. F. Anderson, B. F. Goodrich Co., chairman. John Axelson, Johns-Manville Corp., reported the results of the D-11 letter-ballot on the specification for rubber rings for asbestos-cement pipe, and the subcommittee voted to override the vote by Underwriters Laboratory requesting that the oxygen-bomb aging method replace the oven-aging method. The other two negative votes, dealing with modulus and compression set requirements, were withdrawn with the understanding that the table would be subject to review in the future as more data are made available. An editorial change was made in Table I to change the title from "Test" to "Hardness, Durometer A, number."

Simon Collier

The subcommittee voted to submit to D-11 letter-ballot a proposed tentative test method for sealability of gasket materials. The method, developed over the past five years by Section 10 of Tech A, was presented by George D'Olier, Raybestos-Manhattan, Inc. The rubber ring task group, headed by Dr. Axelson, was assigned to review the draft proposal on natural rubber rings for joints in asbestos-cement water piping, developed by Working Group K of ISO/TC 45. Comments will be prepared for the U. S. representative to ISO/TC 45. A field status report from the O-ring, task group was read.

Subcommittee 7—Rubber Latices, T. H. Rogers, chairman. The subcommittee agreed to write up and submit for letter-ballot a new procedure for determining viscosity, which would delete the capillary method and substitute use of a Brookfield LVF viscometer in its place. The established task force on the Newnham ZnO test reported that the test is reproducible, but that no correlation has been established between the test results and latex applications. The subcommittee decided to review the situation at next year's meeting.

A task group on the correlation of methyl red end-point with the indicated pH end-point in determining alkalinity in D 1076-59 reported that the pH method results in higher values. A task group was appointed to resolve the problem. A report was given on the Milan ISO/TC 45 meeting on latex.

Subcommittee 8—Nomenclature and Definitions. R. G. Seaman, chairman. The subcommittee wound up in a deadlock over two key definitions, one changing the definition of a rubber from 10% set after extension-retraction to 50%, and the other defining an elastomer. Each of the nine negative votes from the March, 1961, D-11 letter-ballot on revising the D 1566-60T definition of rubber was reviewed, but after considerable discussion no vote could be reached either to override the negative votes or to sustain them. The committee voted to defer action until its next meeting, in the meantime instructing Task Group 1 to test extension set of rubbers which are claimed to have more than 10% set, and plastics said to have less than 50% set.

A motion to override the two negative votes on the D-11 letter-ballot on the elastomer definition ended in a tie, with one of the main objections to the definition being that it was more restrictive than the rubber definition. The vote will be brought up again at the next meeting.

The subcommittee recommended that in addition of the codings for the "M" or polymethylene family of elastomers to D 1448-58T, recommended on page 6 of the preprint of the annual D-11 report, in the ACM coding "ethyl acrylate" be changed to "ethyl or other acrylates," and that in the ANM coding, "ethyl and butyl acrylate" be changed to "ethyl or other acrylates."

Neil Catton, Du Pont, reported on the May, 1961, meeting of the Working Group L on terminology of ISO/TC 45, noting that the group held an organizational meeting and is asking for suggestions from member countries on how to proceed with its work. Member countries are asked to provide WG-L immediately with existing definitions for "elastomer," "rubber," and "vulcanization." WG-L agreed that there is a need of definitions that will separate "elastomers," "plastics," and "high polymers," and that it has the responsibility for acting as an arbitration and advisory group on terminology and its interpretation for customs officials in various countries.

Mr. Seaman resigned as chairman of Subcommittee 8, and the subcommittee voted its appreciation of his work as chairman.

Subcommittee 9—Insulating Tapes. W. H. Meade, Boston Edison Co., chairman. The subcommittee resolved the one negative vote on addition of moisture resistance requirements to D 1373, ozone-resistant rubber tape, by editorial changes. There was considerable discussion over the method of making water resistance measurements. The first draft of a butyl insulating tape specification was discussed, along with test results on material compounded by Enjay laboratories. It was suggested that the formulas be considered by manufacturers, and that they make factory samples if feasible. A task group was appointed by the chairman to review test methods for both tape specifications and report recommendations both on test methods and on formulas presented.

Subcommittee 10—Physical Testing of Rubber Products. L. V. Cooper, Firestone, chairman. The subcommittee voted to change the standard temperature in D 412-51T, tension testing of vulcanized rubber, to 23 ± 1° C. to conform with E 171-60T. The subcommittee overrode the negative vote on the change in D 395-55, compression set of vulcanized rubber, to 25% standard deflection, and also voted to retain D 1415-56T, standard hardness of vulcanized natural and synthetic rubbers, as a tentative. The subcommittee also voted to override the negative votes on letter-ballot and advance D 1456-57T, strain testing of vulcanized rubber, to standard.

It was voted to rewrite D 1415-56T, international standard hardness of vulcanized natural and synthetic rubbers, to include use of the micro-hardness tester, and to request a D-11 letter-ballot on the rewritten method. Conditioning time for specimens for test at elevated temperatures was retained at 10 ± 2 minutes. D-11 was requested to recommend to ASTM that the report of William King, Acushnet Process Co., on the use of a single deflection in D 395-55, compression set of vulcanized rubber, be published as a standard testing procedure.

The subcommittee authorized appointment of a committee to investigate possibility of writing one method for D 1415-56T to include use of Shore A, B, C, and D durometers; authorized the chairman to submit D 412-51T, tension testing of vulcanized rubber, as it will be rewritten, for D-11 letter-ballot; instructed the chairman to procure information either to sustain or reject the proposal of Tech A to provide a 10% deviation in the case of buffed specimens in D 2000, proposed classification specification, and requested that the Delft tear test be included in the subcommittee's study of tear tests, and that some work be done on testing gas permeability of rubber.

Subcommittee 11—Physical Testing of Rubber Products. W. P. Tyler, Goodrich, chairman. Following a report on testing programs on bound styrene and IIR determination in rubber compounds, presented by the chairman, the subcommittee voted to submit these sections of D 297-60T, chemical analysis of rubber products, together with the results of the statistical analysis, to subcommittee ballot, after further consultations with statisticians and with Subcommittee 28.

After a discussion of nitrogen determination in crude natural rubber, it was agreed that the subcommittee will probably submit to Subcommittee 12 procedures based on the British standards method with modifications that will be proposed after a short preliminary study. The subcommittee will study the proposed ISO method for determining iron in crude rubbers to determine whether they should be approved as the ASTM method. It was reported that a task group is being organized to study present procedures, as proposed by ISO, with new methods of ash analysis, particularly for zinc oxide, to be studied, and tests to be made on a proposed modification in the method for titanium determination.

It was reported that results on determination of carbon black in rubber compounds by the pyrolysis method currently used for masterbatch analysis lend support to this method of analysis for unvulcanized compounds. It was also noted that continued contact with Committee E-15 on methods of analysis of industrial chemicals has been of value, and that eventually specific problems will be studied.

Subcommittee 12 — Crude Natural Rubber, I. D. Patterson, Goodyear, acting chairman. Following investigation of the three negative votes on the D-11 letter-ballot on addition of a procedure for nitrogen determination to D 1278-58T, methods of chemical analysis of natural rubber, the subcommittee voted to recommend a modification of the procedure for D-11 letter-ballot and withdraw the procedure in the 1961 D-11 annual report. The subcommittee voted to ask Subcommittee 11 to reconcile the differences between the ISO/TC 45 and ASTM D-11 methods for determination of iron in natural rubber.

A partial report by L. B. Mason on evaluation of an experimental rubber developed by the French Rubber Institute, MT-60, was summarized. Subcommittee 12 will prepare a further summary report when all tests in progress are completed and distribute it to its members and Dr. J. LeBras. No further tests are planned until the rubber achieves commercial production.

A summary has been made of reports from 23 of 26 laboratories in various countries on their work with the International Interlaboratory Physical Test Program on eight different types of natural rubber varying from very slow to very fast curing. Copies of the summary, ISO/TC 45 WG-C, USA, will be distributed to members of Subcommittee 12 and participating laboratories. It was requested that comments be sent to Dr. Stiehler so that specific recommendations on methods of testing physical properties of natural rubber may be made within the next six months.

Dr. Southworth, of the Rubber Research Institute of Malaya, reported that a report should be available within a year on an extensive study of Cu and Mn contents in natural rubber and their effects on rubber properties. The Rubber Manufacturers Association, Inc., specification of 10 ppm. of Cu and 8 ppm. of Mn in natural rubber had been criticized on grounds that the specification for Cu was too low, and that for Mn was too high.

C. J. Glaser, Lee Tire & Rubber Corp., liaison with the RMA crude rubber committee, reported that a second draft of a new edition of the Green Book of "International Type Descriptions and Specifications for Natural Rubber" has been circulated to participating organizations. He also reported that various types of coatings are being investigated which might improve the service life of the type of samples of international grades of natural rubber maintained by the RMA. He will welcome suggestions on the subject, he said.

Ralph Wolf, of the Natural Rubber Bureau, reported that use of Technically Classified Rubber is increasing in the United States, particularly among small and medium sized companies, emphasizing that this rubber is available in the lower grades, and that the Natural Rubber Bureau will furnish lists of packing houses in Malaya having such rubber. He also noted that George W. Sadler, former laboratory manager for Beebe Rubber Co., is now technical service representative for the NRB in the New England area.

Subcommittee 13 — Synthetic Elastomers, B. S. Garvey, Jr., Pennsalt Chemical Co., chairman. The subcommittee voted to submit to subcommittee letter-ballot a proposed revision of the procedure on assigning SBR numbers, submitted by the task group on numbering of synthetic numbers. The letter-ballot will include the procedure and a revision of Table 2 of D 1419-60aT in accordance with it.

The subcommittee approved decision of the joint D-2/D-11 task group to undertake a test program for determining definite analytical descriptions of types of extender oils, following completion of an earlier test program on a number of oils. A negative vote on revision of Section 8 (a) in D 1417-59, as given in the preprint report of D-11, was resolved by making an editorial change on measurement of surface tension in low-viscosity latices.

It was voted to submit to concurrent letter-ballot of the subcommittee, Subcommittee 14, and D-11 a proposal that the level of accelerator in test recipes for furnace black masterbatches and oil-extended furnace black masterbatches be set at 1.75 phr. of MBTS. The level was selected after an extensive cross-test program.

A correction table for use of determination of oil in the 1600 and 1800 series of SBR will be submitted to letter-ballot of the subcommittee and D-11, and work will be done on methods for determining gel content.

The subcommittee will request Subcommittee 28 for statistical procedures for conducting interlaboratory tests, definitions for repeatability and reproducibility, and procedures for analyzing data in order to obtain values for repeatability and reproducibility. Sec-

tion 1 on sampling is still looking for a suitable method for determination of moisture in black masterbatches for use in sampling. A report was given on the meeting of Working Group C of ISO/TC 45, copies of which will be distributed to committee members.

Subcommittee 15 — Life Tests for Rubber Products. G. C. Maassen, R. T. Vanderbilt Co., chairman. The subcommittee resolved three of the negative votes in the letter-ballot on proposed specification of tubular oven aging, and three were withdrawn, so that the method will now be submitted to the ASTM for acceptance and publication, with the recommendation that it be submitted to Committee E-1 relative to oven design. D. Milnes, Ozone Research & Equipment Corp., reported that a survey of dynamic testing in ozone shows that dynamic testing is generally more severe than static, and that many types of machines are now in use. During the next six months tests will be conducted and data accumulated on the various machines, he reported, asking that any person who has dynamic testing equipment communicate with him, describing the equipment, testing procedure, and results obtained.

The subcommittee resolved three negative votes on the letter-ballot on D 1149-60T, accelerated ozone cracking of vulcanized rubber, and overrode the other negative vote. Editorial changes will include the phrase, "observation under 2X magnification," and specific number ratings under the picture ratings of cracked specimens.

It was announced that ISO/TC 45 plans to conduct a round-robin dynamic ozone test, and that members of the proposed task group include D. Milnes; George Decker, Monsanto Chemical Co.; C. W. Lemland, Enjay Laboratories; C. K. Chatten, New York Naval Shipyard; W. H. Bryan, Du Pont; and L. E. Carlson, St. Joseph Lead Co.

J. E. Norton reported that specifications for D 749-43T, calibration of a light source used for accelerating the deterioration of rubber, and D 750-55T, resistance to accelerated light aging of rubber compounds, are being revised to include the plastic chip method, and that tentative revisions will be distributed before the next regular meeting. It was agreed that a specification for a break-in period for use of the RS-type sunlamp in D 925-55, contact and migration stain of vulcanized rubber in contact with organic finishes, should be included in the specification, since both committee members and the manufacturer have found light intensity and spectrum changes quite pronounced in the first 20-25 hours of operation, leveling off after that. R. W. Jones, Gates Rubber Co., and W. H. Watson, Polymer Corp., Ltd., were appointed to revise the specification.

The subcommittee overrode unanimously the one negative vote in the letter ballot on D 572-53, accelerated aging of vulcanized rubber by the oxygen-pressure method. There was also discussion of aging at oxygen pressures up to 5,000 pounds. The subcommittee also overrode the one negative vote on the letter-ballot for advancing D 1630-59T, abrasion resistance for rubber soles and heels, to standard, and recommended to D-11 that it be so advanced. It was agreed by the subcommittee that in specifications D 454-53, air-pressure heat test of vulcanized rubber, D 572-53 and D-573-53, "percentage change" would be more appropriate than "percentage deterioration," and editorial changes will be made to make this revision and include the method of calculation, making the changes conform to the wording in D 865-57, heat aging of vulcanized natural or synthetic rubber.

Producers were asked to supply two gallons per sample of high-staining blacks to W. Kitzmiller, of Columbian Carbon Co., for use in tests by the task group on staining tendencies of carbon blacks. Blacks will be identified by type and not by producer, it was promised.

Subcommittee 16 — Description and Classification of Rubber Compounds. J. F. Kerscher, Goodyear, chairman. Neil Catton, chairman of Section 4-D of SAE-ASTM Technical Committee on Automotive Rubber, gave a detailed report on proposed ASTM D-2000, classification system for elastomeric materials for automotive applications, and reported the results of the recent D-11 letter-ballot on the proposed tentative. Some of the negative votes objected that the system is too complicated, and since this objection has been dealt with many times, those votes will be overridden, he said. Many of the other negative votes, ranging from straight editorial changes to adding or deleting certain data in the tables, will be reconsidered in Tech A, he added.

Reporting on the meeting of Working Group J of ISO/TC 45, Catton said that the U. S. group presented D 2000, and that although there will be many points of difference, the U. S. delegation expects that many of the D 2000 features will be included in the ISO draft. There now appears a good possibility that the two systems will gradually be merged in time to create a truly international system, he added. The subcommittee agreed to hold a letter-ballot of the subcommittee recommending a volume increase of 10% after 70 hours at 212° F. in distilled water as a requirement of the AA-grade compounds in Suffix L, ASTM D 2000. The action was taken based on a survey of existing requirements of Suffix L, on water absorption, in prevailing industry and military specifications, and based upon the reaction of Section 4 of Committee D-10 to the survey results.

Subcommittee 19 —Tests for Properties of Rubber and Rubber-Like Materials in Liquids. M. F. Torrence, Du Pont, chairman. D. E. Manning, chairman of Task Group A, reported on its work on immersion testing at high temperatures and recommended that di-2 ethylhexyl sebacate plus 0.5% phenothiazine be adopted as a test fluid in D 471-59T vulcanizate immersion in liquids. Manning agreed to establish with the supplier a standard for uniformity and information for characterizing the material in D 471 and will submit this for letter-ballot of the subcommittee as soon as possible. It was agreed to withhold advancement of D 471 to standard and take another letter-ballot of D-11 on modifications to include this standard test fluid, plus modifications suggested by ISO/TC 45.

Subcommittee 20 — Adhesion Tests. H. H. Irvin, Borg-Warner Corp., chairman. It was reported that ISO/TC 45 has accepted D 429-58 Methods A and B in theory for draft proposal, although other methods have been introduced, particularly by the Italians and Russians, and these will be studied further. Initial test results on the Lord conical method for adhesion testing were presented, and it was agreed that more study and more tests are necessary, particularly on comparison of the Lord test with present D 429-58 A, since present data compare the conical method with D 429-56 A, rather than with D 429-58 A. It was decided to hold a round-robin program of tests with other angles of pull for D 429-58 B.

After a discussion of the Method B supplemental proposal on environmental exposure, it was agreed that new points brought out be incorporated in the original proposal and sent to the membership for further study.

W. A. Frye, of Inland Mfg. Division, reported on tests with the Lord conical sample and other types of dynamic testing to check bond value, noting that results confirmed earlier data that such tests are essentially fatigue tests on the elastomer, which do not affect good bonds. It was reported that the situation is the same with ultrasonic or other destructive test attempts. It was reported that Section 4 of ASTM-SAE Tech A has apparently stopped work on assigning values to the K_1 and K_2 adhesion suffixes of D 735-60T, elastomeric compounds for automotive applications. The subcommittee will be solicited for ideas on the suggestion that bond values might better be determined on actual products.

Subcommittee 21 — Testing of Rubber Cements and Related Products. John F. Anderson, Goodrich, chair-

man. The subcommittee held three meetings, one of Task Group 2-B on wire cord to rubber adhesion, one of 2-A on textile cord to rubber adhesion, and one joint meeting with Subcommittee 20. Task Group 2-B reported that a tentative method on test of adhesion of vulcanized rubber to a single-strand wire was approved by letter-ballot of the subcommittee and then submitted to D-11 letter-ballot in June. The task group, now engaged in developing a method of testing adhesion of multiple-strand wire, believes that the proposed method for single-strand wire can be adapted with modification for immersion depth. The first set of interlaboratory tests for testing multiple-strand adhesion was discussed, and arrangements were made for a second series of tests, scheduled for completion in time for evaluation at a meeting on November 8.

George Harrison, chairman of Task Group 2-A, presented the fourth draft of the "H-Pull" test for measuring adhesion of textile cord to rubber, reporting that the method will be submitted to subcommittee letter-ballot. The task group has described three possible methods for dynamic tests of textile cord adhesion, the Albertoni, Goodrich, and Continental CF test methods, and will make a survey to find out whether the various types of equipment are available in member laboratories so that interlaboratory tests can be set upon the problem of differentiating between fatigue and dynamic adhesion testing.

Subcommittee 22 — Flexible Cellular Materials. T. H. Rogers, chairman. The subcommittee approved advancing D 1055-59T, specification and methods test for latex foam rubbers, and D 1056-59T, specification and methods of test for sponge and expanded cellular products, from tentative to standard. The committee decided to retain D 1564-59T, flexible urethane foam, and D 1667-59T, sponge made from closed-cell poly (vinyl chloride) or copolymers, as tentatives because of constant changes taking place. A proposed specification and test method for rubber curled hair was reviewed and will be rewritten to incorporate recommended changes, with copies sent to the subcommittee for letter-ballot. After hearing a report of Working Group H of ISO TC 45 meeting, the subcommittee agreed that ISO should be concerned with general test methods rather than with finished products as at present.

Subcommittee 23 — Hard Rubber. Henry Peters, Bell Telephone Laboratories, chairman. The subcommittee voted to hold a letter-ballot on a proposed draft of a method for classification of general-purpose and special-purpose hard rubber materials, including a vote on whether the classification should be proposed to D-11 for inclusion in D 530-60T, testing of hard rubber, or whether it should be proposed as a separate standard. The proposed revision of D 639-60T, methods of testing battery containers made from hard rubber, will go to D-11 for letter-ballot, after the committee resolved by editorial change the lone negative vote to the subcommittee letter-ballot.

John J. Allen

The subcommittee discussed Documents X, Y, and Z, forwarded for comment, of Working Group G, ISO/TC 45, and agreed to confine work to hard rubber methods and to exclude electrical tests except as they apply to hard rubber. The chairman was instructed to contact the convenor of Working Group G to correct erroneous references to ASTM D 530-60T which are included in Document Z. Dr. Stiehler spoke briefly on cooperation with the ISO and other international groups.

Subcommittee 24 — Rubber and Rubber-Like Coated Fabrics. K. L. Keene, U. S. Rubber, chairman. W. H. Bryan reported on the status of low-temperature crack testing methods being investigated by a task group, stating that additional tests will be conducted utilizing the modified WADD test jig and low-temperature brittleness tester specified in D 746-57T. The task group is tentatively scheduled to meet in Philadelphia, September 20, to review results of these tests and write a tentative test method to submit to the subcommittee at its spring meeting.

K. L. Winkley reported that flammability tests show that BTU content of commercially available gases throughout the country vary widely, and on the basis of this information he is now obtaining equipment for measuring the heat of the flame. He agreed to investigate the use of candles or measured quantity of absolute alcohol, as suggested during the meeting. He will also investigate the effect of trapped gases on combustion.

The chairman reported that the Taber abrasion round-robin indicated that the method used was not suitable, and that the Taber Co. has suggested several new approaches. At present the work will be confined to a machine at the Taber plant and one at Mishawaka, but as soon as a satisfactory program has been developed, another round-robin will be started, he stated. During discussion it was suggested that the chariman investigate the following test procedures for abrasion resistance: the U. S. Testing Co. abrader, electrical tape testing procedure MIL-W5866, the procedure used for testing packing material, and the air jet being considered by Section 1 of Subcommittee B-9 of Committee D-13.

The subcommittee discussed the remark of one of its members that there is no specified procedure for measuring the thickness or weight of coating on a coated fabric, but no request was made for appointment of a task group.

Subcommittee 25 — Low-Temperature Tests. R. S. Havenhill, St. Joseph Lead Co., chairman. W. H. Bryan, chairman of the task group on tests of low-temperature coated fabric, reported that the WAD jig gave a lower coefficient of variation than the D 746-48 apparatus and said that future tests will be carried out using an easily modified, gravity operated WAD jig and an easily modified D 746 apparatus with speed measurements and reduced striking arm clearance.

M. F. Torrence reported that the proposed 25% deflection method proposed by the ISO gave lower results on soft stocks and higher results on hard stocks than the present method for low-temperature compression set in D 1229-55, with the difference probably due to crystallization, which is affected by stress. In view of this, he will check with the Army, Navy, Air Force, and automotive representatives to see whether the proposed change would cause any changes in specifications which could not readily be made.

W. A. Frye reported interest and activity on stiffness and low-temperature hardness at the ISO/TC 45 meeting, and F. L. Roth promised to send the chairman the results of his low-temperature work with the ISO hardness instrument.

Subcommittee 26 — Processibility Tests. R. H. Taylor, chairman. The subcommittee voted to override the one negative vote on the D-11 ballot on advancement of D 1646-59T, method of test for viscosity and curing characteristics of rubber by the shearing disk viscometer method, to standard. The negative ballot asked for inclusion of the 48-groove rotor and editorial modification of the requirements for the film used with sticky materials. The subcommittee accepted the editorial change, but felt that since

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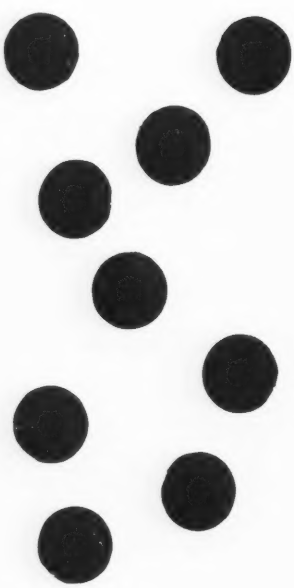

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LOS ANGELES 5, CALIFORNIA — 3350 Wilshire Boulevard — DUnkirk 2-7333

NEW BRUNSWICK, NEW JERSEY — 46 Bayard Street — KIlmer 5-1828

NEW YORK 17, NEW YORK — 60 East 42d Street — YUkon 6-7127

ARGENTINA — **Cabot Argentina S.A.I. yC.**, Sarmiento 930-2°A, Buenos Aires

CANADA — **Cabot Carbon of Canada, Ltd.**, 121 Richmond Street West, Toronto 1, Ontario

ENGLAND — **Cabot Carbon Limited**, 62 Brompton Road, London, S. W. 3

FRANCE — **Cabot France S.A.**, 45, rue de Courcelles, Paris 8

ITALY — **Cabot Italiana S.p.A.**, Via Larga 19, Milano

AUSTRALIA — **Australian Carbon Black Pty. Limited**, Millers Road, Altona, Victoria (jointly owned)

Printed in U.S.A. August

, August.

the 48-groove rotor was carefully considered and rejected in 1958, there was no reason to reconsider it.

It was decided to resolve the three negative votes on the subcommittee letter-ballot on a proposed method of test for shrinkage of rubbers by authorizing the chairman to recommend to D-11 that the method be editorially revised so that it applies only to SBR rubbers and then submitted to D-11 letter-ballot, and that a task group of members interested in shrinkage of other than SBR rubbers be appointed to consider modification of the method so that it would be generally applicable to other rubbers.

George Decker reported that his task group on pneumatic pressure had found a definite relation between pressure and Mooney viscosity of high molecular weight rubbers, with the effect not great after a pressure of 40 psi. in an eight-inch stroke. The task group was asked to make definite recommendations to the subcommittee on a standard pressure. J. Kerscher reported that his task group believes it can write a test procedure which will give uniform results using the No. 1, Garvey-type extrusion die. The task group will prepare such a procedure for subcommittee letter-ballot.

Subcommittee 27 — Tests of Resilience. W. A. Frye, chairman. The subcommittee discussed the forced vibration method being considered by it, and interest was expressed in standardization of drop-ball resilience tests. A task group to include George Decker, Ross Shearer, and the chairman was set up to investigate interlaboratory reproducibility of the Goodrich Flexometer method, and it was voted to retain D 623-58 as standard while the investigation proceeds. The subcommittee also reviewed editorial changes made in D 945-59, methods of test for mechanical properties of elastomeric vulcanizates under compressive or shear strains by the mechanical oscillograph.

A report was made on the meeting of Working Group E of ISO/TC 45, and members discussed a translation of the DIN 53513 draft on "Determination of the Viscoelastic Properties of Rubber under Forced Vibration Beyond Resonance", a proposal of the British Standards Institution on a method of dynamic testing of vulcanized rubber; and a proposal of the German delegation to Working Group E on terms, definitions, and correlations in dynamic testing of high polymers.

Subcommittee 29 — Compounding Ingredients. A. E. Juve, chairman. J. H. Gifford, chairman of the task group working on development of a suitable SBR test recipe for specification testing of carbon blacks, reported that the large difference in modulus obtained with blacks which are very dry compared with those having normal moisture content has not yet been satisfactorily explained, nor has a recipe less sensitive to the differences been sufficiently evaluated to warrant a specific proposal at this time.

G. C. Maassen, chairman of the task group to revise D 15-59T, sample preparation for testing rubber products, and incorporate D 1522-60T, methods for testing carbon blacks in natural rubber, reported that there were only two negative votes on the subcommittee letter-ballot, but many of the affirmative votes contained valuable suggestions for corrections and clarification which will be considered by the task group instructed to prepare a final draft for letter-balloting of D-11. Ralph Treat, chairman of a task group to check Industry Reference Black No. 1 for stability, reported that after two years and three months no evidence of change has been observed.

C. W. Sweitzer reported that a round-robin concerned with establishing visual ratings for pigment dispersion found that individuals had little difficulty in ranking dispersions in order of excellence, but to establish ratings would require visual standards. The task group will continue to work on a visual rating and at the same time draft a proposed method for quantitative light microscope procedure. A task group on reconciling the differences in procedure for compounding, mixing, and curing butyl rubber as given in D 15-59T and that employed by butyl producers is preparing a letter detailing differences in changes recommended to reconcile differences.

A task group headed by Frank Svetlik recommends that an alternate procedure using a complete masterbatch of natural rubber except for the carbon black, to be used for testing carbon blacks, be written into D 1522-60T or D 15-59T, whichever is appropriate. When the proposed text for the addition is submitted, data will be included to show that the masterbatch has a reasonable shelf life. Dr. Stiehler commented that the NBS standard of oil furnace black 378 is still being sold although many D-11 members have complained about its grit content, and since the supply is being depleted a decision must be made on whether or not to replace it. Since Industry Reference Black No. 1 is the same type of black, in effect two similar reference blacks are in existence controlled by two different bodies, he said. The subcommittee will consider the question and make a recommendation at its spring meeting.

Tech A Report

R. C. Waters, General Motors Corp., has been elected chairman of the joint American Society for Testing Materials-Society of Automotive Engineers Technical Committee on Automotive Rubber. Maurice Lowman, Goodyear, was elected vice chairman.

Tech A approved and submitted to ASTM and SAE the following letter ballots: changes in Silicone Table V of D 735-60T, specifications for elastomeric compounds for automotive application; Materials Table D 2000, which should eventually replace D 735, culminating five years of work by Subsection 4-D; addition of grades 2245A and 2255A to D 1170-59T, specifications for non-metallic gasket materials for automotive and aeronautical purposes, which had been referred back and on which negatives were resolved. In addition several changes in D 1170-59T are being letter-balloted to add new grades and delete others. Tech A also approved letter-ballots to SAE alone on 30R1, 30R2, 30R3, and 30R4, the last three updating present SAE specifications on fuel and oil hose and the first a new specification.

ISO/TC 45 Report

The American Group to ISO/TC 45 on rubber reported to Committee D-11 that at the ninth meeting of the Group, held May 8-13 in Milan, Italy, the number of working groups was increased to 13 from the previous 11. The added two groups were rubber hose and industrial rubber footwear. U. S. representation on the two groups has not yet been decided. Only one of the previous 11 working groups dealt with products. Approval was given for the circulation of 15 draft ISO proposals to member countries. The work of the previous eight meetings had resulted in 14 draft proposals.

In order to speed up the work of ISO/TC 45, it was decided to hold meetings every year. The tenth meeting will be held in London within a week of the IRI International Rubber Conference, May 21-25, 1962. Sweden invited ISO/TC 45 to hold its eleventh meeting in Stockholm in June, 1963.

The Milan meeting included 96 delegates representing the U. S., United Kingdom, France, Germany, Hungary, Italy, Netherlands, Poland, Sweden, Switzerland, and USSR. Meetings were held by all 11 working groups. B. S. Garvey, Jr., was convenor of Working Group C on physical tests of unvulcanized rubber, and R. H. Taylor was convenor of Working Group D on physical tests of vulcanized rubber. Other members of the American delegation were John J. Allen; Neil L. Catton; W. A. Frye; J. C. Montermoso, Department of the Army; T. H. Rogers, and R. D. Stiehler. Stiehler was leader of the delegation.

Simon Collier Given Highest ASTM Award

Simon Collier, chairman of Committee D-11 on Rubber and Rubber-Like Materials and of Committee E-11 on Quality Control of Materials of the

American Society for Testing Materials, was presented with an honorary membership in the ASTM on June 27 during the sixty-fourth annual meeting of the ASTM in Atlantic City, N. J.

The award, made at the President's Luncheon in Chalfonte-Haddon Hall, is the highest given by the ASTM to a member. Honorary members are persons of widely recognized eminence in the field of work covered by the ASTM, or those who have rendered it especially meritorious service.

Collier, formerly director of quality control of Johns-Manville Corp., New York, N. Y., has been a quality control consultant on asbestos fiber and products since his retirement in 1959.

He joined ASTM in 1926, was member of the board of directors from 1948 to 1951, and received the Society's Award of Merit in 1956. He has been chairman of D-11 since 1946, and of E-11 since 1958. In addition he is secretary of Committee C-17 on Asbestos-Cement Products and a member of committees D-24 on Carbon Black and E-8 on Nomenclature and Definitions.

Collier, furthermore, is a founding member and former president of the American Society for Quality Control, which last year presented him with its Edwards Medal, awarded to persons who have made contributions through administrative service to the advancement of quality control.

Collier, a graduate of Worcester Polytechnic Institute with a B.S. in chemistry, worked for Boston Belting Co. for several years as a chemist, then held a post with the National Bureau of Standards as a chemist in charge of rubber work. In 1923 he joined Johns-Manville as manager of its inspection and control department, was promoted to staff manager of the department, and in 1946 was appointed director of quality control.

A leading proponent of the statistical approach to quality control, Collier has spoken before an estimated 70,000 persons in industrial groups, technical societies, and universities in an attempt to educate persons at all levels of management to a recognition for the need of quality control. He has also worked to advance use of statistics in testing within the ASTM.

J. J. Allen Receives ASTM Award of Merit

John J. Allen, a member of the general research management staff of Firestone Tire & Rubber Co., Akron, O., and secretary of Committee D-11 on Rubber and Rubber-Like Materials of the American Society for Testing Materials, was given the ASTM Award of Merit, June 28, at the Awards Luncheon, held as a part of the Society's sixty-fourth annual meeting at Atlantic City.

Allen joined United States Rubber Co., New York, N. Y., in 1922 as a chemist, following his graduation from Case Institute of Technology with a B.S. in chemical engineering. In 1927 he went to Firestone, later becoming chief chemist at the company's Fall River, Mass., facility, then technical director of the industrial products division.

He has been a member of ASTM and of Committee D-11 since 1931 and was a member of the ASTM board of directors from 1939 to 1941. At present, in addition to serving as secretary of D-11, he is editorial chairman and finance chairman of Subcommittee 3 on Tests of Thread Rubber, represents ASTM on the SAE-ASTM Joint Committee on Automotive Rubber, and is a member of the American Group of the International Standards Organization/Technical Committee 45 on Rubber. Previously Allen was a member of the ASTM ordnance advisory committee and its general research management staff and was active in the ASTM Cleveland and New England district councils.

Grant T. Carpenter

RUBBER WORLD Award

Grant T. Carpenter, since 1955 an employe at the Los Angeles plant of The Goodyear Tire & Rubber Co., Akron, O., is the recipient of the 1960-1961 RUBBER WORLD award, a $100 grant made to the student doing the best work for the year in the Tlargi Rubber Foundation rubber technology laboratory I course.

Carpenter, 30 years old and a native of Worcester, Mass., earned a B.S. degree in chemical engineering at Tufts University, Medford, Mass., in 1953. He joined Goodyear in 1955 and worked in the technical service section of the development department until 1960, when he became a tire compounder in the same department. In 1957, he took part in a special training session on Bag-O-Matic presses and subsequently assisted in initiating the Goodyear-California Bag-O-Matic curing program.

Carpenter lives in Buena Park, Calif., with his wife and three children.

Tlargi Seeks Funds For Foundation Use

The Los Angeles Rubber Group Inc., plans a fund-raising drive to help support the Tlargi educational program. The Group is offering its members and friends who support this drive an opportunity to participate in a drawing for a choice of three super-colossal prizes. The choices are:

"A 21-day vacation trip for two by sea and air to Tahiti-Moorea-Hawaii. The world's finest vacation. Arranged through Travel Center, Inc., Los Angeles."

or

"A 6" x 12" laboratory rubber mill of late design. Donated by Rubber Equipment, Inc., El Monte, Calif."

or

"Two thousand dollars ($2000.00) CASH."

There will also be consolation prizes.

Enthusiastic support of this worthwhile cause will insure continuation of Tlargi's education program, according to the Group officers. The drawing will be held at the Christmas party on December 8, 1961. Winner need not be present. Donation tickets will be issued at $1.00 each, or $10.00 for a book of 12.

Send donations or requests for tickets to L. E. Budnick, c/o Ohio Rubber Co., 6700 Cherry Ave., Long Beach 5, Calif.

Outing Date Change For Connecticut RG

The Connecticut Rubber Group has announced that the date for its annual outing has been changed to Saturday, September 16, from September 9 as previously reported. Members are thus warned NOT to show up a week early, expecting to find the party in full swing.

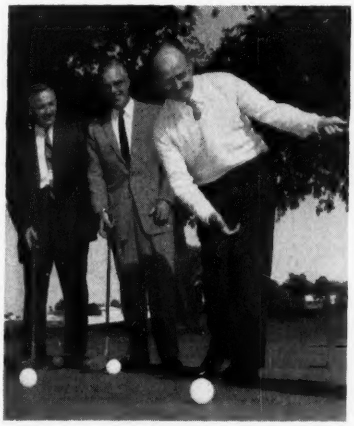
Akron Group Holds Enjoyable Outing

The annual outing of the Akron Rubber Group on June 16 climaxed the 1960-1961 season with an attendance of 950 members and guests at the Firestone Country Club, Akron, O. Because of the large number of entries, the golf tournament was played on Thursday and Friday, June 15 and 16.

D. Chovan was general chairman of the outing, assisted by the following committee chairmen: G. Becker, golf; L. V. Cooper, food and location; J. A. McDonough, prizes; and M. Bobbitt, decathlon.

Winners of the Thursday golf tournament were: low gross, R. Spefanic; accuracy, S. Semegen and H. Roth; long drive, K. Burgess and B. Martin. Th winners on Friday were: low gross, C. Schlegel; accuracy, B. Adams and L. Jacobson; long drive, H. Hutch and J. Caldwell.

The giant putter contest winner was W. Parrish, and the decathlon contest was won by R. Wharton.



(Left to right) J. A. Gotshall and S. E. Nickol look on as R. B. Knill follows through with a giant putter

Tobias Studio

The Akron Rubber Group scholarships provided for Akron University chemistry major students have been won by (*seated, left to right*) John Coleman (senior), Milan Konstantinovich (freshman), Miss Deborah Bittaker (junior), and Jerry Kaye (sophomore, not shown). Looking on are (*standing, left to right*) M. H. Leonard, chairman of the Group's scholarship and education committee, and I. J. Sjothun, who is chairman of the Group

CALENDAR of COMING EVENTS

June 12-September 1
Gordon Research Conferences. Colby Junior College, New London; New Hampton School, New Hampton; Kimball Union Academy, Meriden; and Tilton School, Tilton, all in N. H.

August 18
Philadelphia Rubber Group.

September 3-8
American Chemical Society. Chicago, Ill.

September 5-8
Division of Rubber Chemistry, ACS. Hotel Sherman, Chicago, Ill.

September 16
Connecticut Rubber Group. Outing.

September 29
Fort Wayne Rubber & Plastics Group.
Southern Ohio Rubber Group.

October 3
The Los Angeles Rubber Group, Inc.

October 5
Detroit Rubber & Plastics Group, Inc.

October 10
Buffalo Rubber Group. Hotel Westbrook, Buffalo, N. Y.

October 12
Northern California Rubber Group.

October 13
Boston Rubber Group. Hotel Somerset, Boston, Mass.
Philadelphia Rubber Group.

October 17
Elastomer & Plastics Group, Northeastern Section, ACS.

October 20
New York Rubber Group, Henry Hudson Hotel, New York, N. Y.
Akron Rubber Group. Sheraton-Mayflower Hotel, Akron, O.

November 2
Rhode Island Rubber Club.

November 3
Philadelphia Rubber Group.

November 7
The Los Angeles Rubber Group, Inc.

November 9
Northern California Rubber Group.

November 17
Connecticut Rubber Group.

November 17-18
Southern Rubber Group.

December 7
Fort Wayne Rubber & Plastics Group.

December 8
Detroit Rubber & Plastics Group, Inc.
The Los Angeles Rubber Group, Inc. Christmas Party.

December 9
Southern Ohio Rubber Group.

December 12
Buffalo Rubber Group. Christmas Party. Buffalo Trap & Field Club.

December 15
New York Rubber Group. Christmas Party. Henry Hudson Hotel, New York, N. Y.
Boston Rubber Group. Christmas Party. Hotel Somerset, Boston, Mass.

1962

January 26
Akron Rubber Group.

January 26-27
Southern Rubber Group.

February 5-9
American Society for Testing Materials. Committee Week. Statler Hilton Hotel, Dallas, Tex.

February 6
The Los Angeles Rubber Group, Inc.

February 8
Fort Wayne Rubber & Plastics Group.

March 6
The Los Angeles Rubber Group, Inc.

March 20-29
American Chemical Society, Washington, D. C.

March 23
New York Rubber Group. Henry Hudson Hotel, New York, N. Y.

March 24-27
National Association of Secondary Material Industries. Forty-Ninth Annual Convention. Edgewater Beach Hotel, Chicago, Ill.

April 3
The Los Angeles Rubber Group, Inc.

April 5
Fort Wayne Rubber & Plastics Group.

washington report

By JOHN F. KING

Kennedy Expected To Ask Congress To Further Lower Import Barriers

United States foreign trade policy under the Kennedy Administration will begin taking shape toward the end of the year. The lines of the new policy, in which the rubber industry has expressed increasing interest as foreign competition has become more and more apparent recently, are being only guessed at now. But the feeling is growing that Mr. Kennedy will ask American industry to make even more room for foreign producers in American markets when the time comes to extend the Reciprocal Trade Act in the next session of Congress.

The trade act, which expires next June 30, has generated more argument in the past couple of years than any other government program. As foreign products have elbowed their way into an ever-growing share of U. S. markets, a growing number of American industries have begun registering vehement complaint. Their representatives in Congress have echoed these complaints.

The situation has reached the point where U. S. business, labor, and large segments of what we are pleased to call the public state flatly that they have had enough. It is time, they say, for the United States to modify sharply its "free trade" position. A majority in Congress, it would appear, agrees.

It is this difficult situation that the President must deal with when the Reciprocal Trade Program comes up again for extension. The textile industry, just to mention an important one, wants it killed. Others, such as the rubber industry which sees footwear and sundry imports growing by leaps and bounds, also says it wants no more tariff-cutting. The time is here, rather, to take positive steps to protect U. S. industry, be it textiles or rubber products, which has suffered the ravages of disruptive competition from low-wage countries, these industries claim.

Just last May the Commerce Department's Business & Defense Services Administration dramatized the changed situation for U. S. rubber manufacturers in world markets. Synthetic rubber exports, it said in an attempt to soften the blow, rose from $12.5 million in 1949 to more than $200 million in 1960. But where the shoe pinches—on imports—foreign producers boosted their rubber footwear sales in the U. S. to cite just one rubber item, from $1.8 million in 1956 to $74 million in the first 10 months of 1960.

At the same time the dollar value of imported tire and tube products jumped from $6 million in 1956 to $26 million in 1959. In addition, new products, such as imports of the Japanese rubber sandal "zoris" ballooned from 3.6 million pairs in 1956 to 65 million pairs last year.

Plans Still Veiled

Recognizing that the American business community is in no mood to discuss an even larger foreign role in U. S. markets because of statistics like these, President Kennedy has kept mum on his trade policy plans. But his actions have spoken volumes about his preferences on trade matters. He is, it appears from his action, wedded to the idea that trade must be expanded, whatever the cost. He has demonstrated this by his rejection, after only a month in office, of a Tariff Commission recommendation that the U. S. cordage industry be protected by import restrictions. While he was a Senator, he urged that such protection be extended by President Eisenhower.

Following this action, he turned back in June USTC recommendations that controls be put on imports of plate and window glass and leather baseball mitts. He asked the Commission to reopen the investigation to determine if price fixing in the industries involved might be the real reason for their difficulty in meeting competition from imports.

He topped this request, in July, by choosing Howard C. Petersen to take on a job in the White House of blueprinting the new foreign trade program. Mr. Petersen, a Philadelphia banker, also happens to be one of the leading lights in the ultra-progressive Committee for Economic Development, business' most liberal public education and lobbying organization. CED long has favored further dismantling of U. S. trade barriers.

The President tapped Petersen, who is said to have agreed to go on the payroll on a part-time consultant basis, because the State and Commerce Department—which under normal conditions have the chore of framing U. S. trade legislation for consideration by Congress—felt protectionist sentiment had snowballed through the country in such fashion that they couldn't possibly convince Congress to go along with a liberal program.

The Departments told the President in May that if he wanted a liberal program, he himself would have to put his weight behind it to sway protectionist-influence legislators. They also advised him to name someone who could command public support for a liberal program to draft it, sell it to the American public as a necessary in the cold war, and then push it through Congress in the name of President.

Mr. Kennedy bought the idea and invited Petersen to go to work on it. He told the CED official that foreign trade is the second most important piece of Kennedy legislation to go before Congress; the first is foreign aid which the President is now fighting desperately to save.

Thus it appears the new President is committing himself to a thorough going "liberal" program, even though he himself hasn't given a direct hint of the direction in trade policy he will choose. Observers have guessed that the President will choose the liberal approach because of his afore-mentioned tariff decisions and his selection of Petersen for the foreign-trade czar job.

Cite Petersen Speech

They cite the speech Petersen made in Frankfurt, Germany, just one week after he had discussed the special adviser post with the President. Addressing the German Group of the European Committee for Economic & Social Pro-

gress, July 6, Petersen called for across-the-board tariff reduction among the industrial countries of the free world. He said the gradual, selective and—to the liberals—meaningless tariff cutting that characterizes free-world negotiations under present circumstances is passé. What is needed, he said, is a wholehearted effort to make trade between all nations flow freer.

Added to this is the group of people the President has surrounded himself with in the key departmental jobs and the White House staff. Almost without exception they are classified as people determined to keep the U. S. in step—by offering even further tariff reductions—with the economic integration going forward on a regional basis in Europe.

All of this admittedly circumstantial evidence points the way to even more rigorous competition for U. S. industry from foreign producers. The trade program drawn up to supplant the expiring Reciprocal Trade Act, which will go before Congress by next January, is expected to be the indisputable proof.

U. S. Reviews Policy On Rubber Stockpile

As an upshot of the commotion in the Kennedy Administration over civil defense, the new administration is taking another look at its rubber stockpile—examining both natural rubber reserves plus stocks of manufactured rubber products stored in government warehouses against an emergency.

One of the thorniest problems of government which President Kennedy had tackled has been that of civil defense. In a major government reorganization move the President has decided to abolish the Office of Civil & Defense Mobilization (OCDM), which manages the strategic stockpile that includes more than one million tons of rubber. The chief executive wants to run civil defense, proper, as a combination military-civilian show—giving the Pentagon the dominant role—just to assure that the program gets started—while the defense mobilization functions of OCDM, including stockpile management, would be run directly by the White House.

The trouble is that Mr. Kennedy already had appointed a top Louisiana political figure, Frank H. Ellis, as OCDM director. And Mr. Ellis does not relish having his agency broken up, before he gets acquainted with it, while he becomes just another staff adviser in the White House. He privately is threatening to quit if this happens.

At any rate, whatever the President decides to do with the whole civil defense-economic mobilization program, one constructive development in the controversy has been the decision to look over the rubber hoard in the national stockpile of strategic goods.

The object of the survey will be to prepare a new set of estimates on military and civilian rubber requirements to determine government needs. It will be remembered that during President Eisenhower's second term, a similar review was launched, and the end result was the decision to liquidate a hefty portion—470,000 long tons of the estimated total rubber stockpile of 1.4 million tons—of natural rubber over a nine-year period. Well over 100,000 tons of the stock have been sold off since the disposal operation began in October, 1959.

Heading up the new survey will be James H. Higgins, who took over as Chief of the Rubber Branch in the Commerce Department's Business & Defense Services Administration last April. He has charge of a five-man interagency "committee on interim review of Rubber Supply and Requirements" which began work in late June. When completed, the committee will make its report to OCDM, if it is still there, or the small White House mobilization planning staff which the President wants to set up.

President Signs Bill Hiking Tire, Tube Tax

President Kennedy on June 30—one day before the new taxes in the Highway Program were scheduled to go into effect—signed the enabling legislation into law. Effective July 1, as a result, were increases in the excise tax on tires from eight to 10¢ a pound, from nine to 10¢ per pound on tubes, and from three to 5¢ a pound on tread rubber.

This package of tax increases was the main feature of the Highway Financing program which passed the House earlier this year. The Senate Finance Committee wrote a number of changes in the measure—for example it boosted the tread rubber tax from three to only 4¢ a pound—but the House prevailed. In the Senate-House conference held after the Senate passed its slightly changed version of the financing bill, the upper chamber in effect accepted the earlier House version.

As finally approved, the new law provides in addition to the higher tire, tube, and tread rubber excise taxes, these features:

Continuation of the present 4¢-a-gallon federal tax on gasoline and diesel fuels.

A boost from $1.50 to $3.00 per 1,000 pounds on large motor carrier vehicles weighing over 26,000 pounds.

Transfer of another 5% of manufacturers' tax on trucks, buses, and highway trailers from the general Treasury Fund to the Highway Trust Funds, effective July 1 next year.

Extension of the Highway Trust Fund for another three months beyond its June 30, 1972, expiration date. At the same time, all taxes diverted to the Fund will continue for the additional three months of its life.

Repeal of the provisions in existing law requiring 5% of the manufacturers' tax on passenger cars, parts, and accessories to be diverted from the general Treasury Fund to the Highway Trust Fund in the three fiscal years 1962-63-64. This means all automotive excise taxes will go to the general fund.

The rubber industry's program for completing the federal highway construction program on schedule without any increase in user taxes went by the boards in the final version of the measure sent to President Kennedy.

Plugged by Ross Ormsby, of the RMA, this approach would have required less money from the general fund to cover the non-user share of roadbuilding costs than the 8% suggested in the special study of the 1956 interstate highway program conducted by the Bureau of Public Roads. The RMA plan would have enlisted the appropriation of only a third of a billion dollars annually to complete the program by mid-1972, in contrast with annual appropriation of general fund revenues of $600 million in each of five years preceding the start of the program in 1956.

Ormsby, outlining this program to the Senate Finance Committee in June before it acted, noted that $22.9 billion of the $60.5 billion in automotive excise taxes that will be paid the government in the next 11 years will go into the general fund. He said $3.8 billion of these general fund revenues would be all that would be needed to keep the highway program on schedule.

Thus, he said, the RMA approach would avert the recurring financial crises that have beset the highway program since its inception while at the same time foreclose any increase in user taxes.

Like the House, however, the Senate went ahead with its version of the Highway Bill without accepting this argument.

FTC Price-Fix Hearing Resumes in September

The Federal Trade Commission will wind up presentation of its price-fixing charges against the tire industry when the fourth set of hearings in the long drawn-out case resumes in September. At that time the FTC examiner who is conducting the hearing will turn the witness stand over to the companies and The Rubber Manufacturers Association, Inc., which stand accused in the alleged price-rigging conspiracy, to present their side of the case.

FTC Attorney James S. Kelaher, who acts as prosecutor in the federal agency's trial hearing, was the central figure in the third round of hearings, June 27-28, in Washington. He introduced into

(*Continued on page 104*)

industry news

Big Four Plan to Make Two-Ply Tires For 1962 Standard-Size Automobiles

Firestone Tire & Rubber Co. announced plans July 14 to produce two-ply tires for 1962 models of several standard sizes of automobiles, and a check with the other members of the Big Four tire companies showed that Goodyear, Goodrich and U. S. Rubber are also set to produce two-plies for standard models. As with the standard four-ply original-equipment tires, the two-plies are rayon-cord tires.

The Firestone announcement said that the two-ply tires for standard cars will have four-ply ratings. Additional strength is gained by changing the angle of the tire cords to crowd them closer together and to improve stability, Firestone explained.

In addition, the announcement stated, the plies are locked on to the beads by building the tire so that the two plies grip the beads in opposite directions instead of in the same direction. Extra layers of nylon cord between the plies at the bead are used to reinforce the beads and lower sidewalls, the first time that Firestone has not used cotton for this purpose.

Another innovation, which is not related to the two-ply construction, is a layer of red rubber applied while hot to the underside of the tread and pressure stitched. The red layer is designed to warn the motorist when his tread is worn before he is actually riding on the fabric.

Two-Plies for Compacts

Announcements by members of the Big Four that they are ready to make two-plies for standard cars is an expected follow-up to their introduction of two-ply tires for compact cars. Although the announcement was never made that two-plies had been adopted as original equipment for compact cars, the fact is that most compact cars now coming off the lines are equipped with the two-ply tires. This listing includes most Corvairs, Falcons, Comets, Specials, Lancers, and Valiants, plus a large percentage of Rambler Americans and Classic Sixes. The station wagons in these lines are still using four-ply tires. All the compacts equipped with two-ply tires have 13-inch wheels except the Rambler, which has a 15-inch wheel. Two other compacts with 15-inch wheels, Tempest and Lark, have not yet adopted two-ply tires as original equipment.

Automotive News reports that two-plies will be original equipment this fall for five of the standard cars, Chevrolet, Ford, Plymouth, Dodge Dart, and Mercury. There are no plans at present to use two-ply tires for the heavier cars, Lincoln, Chrysler, Pontiac, Oldsmobile, and Thunderbird, the magazine reports. It is probable, however, that continued development of two-ply tires will make them suitable for heavyweights.

Although nylon manufacturers had some hopes of getting a foothold in the original-equipment market with the switch to two-plies, it is certain now that rayon tires will be original equipment for the 1962 models. What happens a year from now is anybody's guess, though cuts in nylon prices expected next year may have some effect on the decision.

However, in the two-plies as in the four-plies, a substantial number of nylon tires will be sold as replacements.

Two-ply tires were introduced as original equipment for compacts quickly and quietly. They were first field tested by auto manufacturers at the beginning of the year and by May were on a majority of compacts currently in production. Replacement tires had already been available for some time, and U. S. Rubber, in particular, has sold 400,000 two-ply replacement tires since it introduced them in 1958.

Since no great amount of publicity was given to the fact that two-plies were being used as original equipment, and no specific models of cars were identified, it is quite probable that most drivers now riding on the two-plies are not conscious of the fact. On some tires the two-ply marking is on the outside of the tire, but on many it is on the inside, close to the bead. The fact that many of the tires carry the marking "4 Ply Rating-2 Ply" may also create some confusion. The use of the ply rating system, although standard on truck tires for the past 30 years, is new to the passenger-tire market and therefore unfamiliar to the motorist.

Most tire companies and auto manufacturers would probably prefer not to play up the switch to two-ply tires. The average motorist, no student of engineering reports, is likely to assume that two plies are not as strong as four.

Educational Campaign

However, rather than have the motorist get misinformation about two-plies, tire manufacturers are now beginning an educational campaign to tell the story about the two-ply tire. Goodyear took full-page ads in the *New York Times*, and Firestone a double-page spread in *Life* for this purpose, and Pennsylvania Tire Co. has told a similar story in a leaflet distributed to motorists.

One fear of tire manufacturers, that cheap, below-standard tires will give two-ply tires a bad name, is brought out in one paragraph near the end of the Goodyear ad, which says, "Unfortunately, you may find so-called 'bargain' two-ply tires that you'll have to be wary of. In short, you can expect to see some two-ply tires that don't measure up to four-ply durability."

In addition, a current press release by Goodrich notes that two-ply tires are not new, having been used in the 1930's when cotton was still the fabric used for tire reinforcement.

Some of the news releases also stress that two-ply tires have been used for a number of years on small foreign cars, where strength requirements were not so great as in the larger American cars.

What's the advantage of a two-ply tire? For the tire manufacturer, a tire anywhere from 4-10% cheaper, because of savings in amount of rubber used, less expensive yarn, and lower manufacturing costs. For the motorist, a softer ride and less heat buildup. Although these advantages may go along with slightly greater tread wear and lower ride stability, manufacturers claim that tread wear is so close to that of the four-ply tire that any differences are not statistically significant. They also

say that there is no significant difference in stability.

Two other claims have been made in advertising: that the greater flexibility of the two-ply tire means that a greater tread area is in contact with the road, giving better traction, and that the greater flexibility means less power required to overcome rolling resistance, resulting in lower gasoline consumption. So far, neither claim has been backed up by test figures.

The two-ply tire is possible because the yarns have become stronger over the years. The first high-tenacity rayon yarn had a tenacity, or ultimate tensile strength, of about three grams per denier. By 1955, rayon tenacity was up to five grams per denier and at present is as high as 5.6 grams. Present nylon yarns have a tenacity of more than nine grams.

To take advantage of the increase in strength it is possible to use a lower denier yarn and increase the fabric end-count and twist. However, because of the higher cost of producing a given weight of light denier yarn, and because of the increased cost of twisting, using a lower denier yarn offers no cost savings.

Using Heavier Cord

The alternative, and the one followed, is to use a heavier yarn and a smaller number of plies. Heavy-denier yarns cost less to produce for a given weight than light-denier yarns. To illustrate, 1100 denier rayon yarn is 57¢ a pound, and 3300 denier yarn only 48¢. In addition, fewer turns per inch are required to give the desired level of fatigue resistance, providing an additional cost saving. Since fabrics woven from heavy-denier cords have fewer ends per inch than those with lighter-denier cords, and since fewer yards of fabric are required, weaving, dipping, and calendering costs per tire are less. Besides, since there are only two plies instead of four, labor cost for tire building is lower. Automation of tire building is also easier with two plies rather than four.

In addition to saving on cost of yarn and tire building, it is also possible to save on the actual amount of yarn used. Although most of the rayon-cord two-plies now being made contain as great a weight of rayon as the four-plies, and some contain even more rayon than the four-plies, some rayon tires and most nylon tires use less yarn for a two-ply than a four-ply. A typical 7.50 x 14 nylon tire has only 1.25 pounds of nylon in a two-ply construction, compared with 1.38 pounds in a four-ply construction. Since nylon yarn sells at 92¢ a pound, the former construction represents a saving of 13¢ on amount of yarn alone.

Even when the weight of yarn is the same, a two-ply tire will generally use up to a pound less rubber skim than a four-ply tire, because heavy-denier plies require no greater insulation than standard plies, and there are only half as many of them.

Specific figures on the two-ply tires are difficult to give, since different manufacturers have adopted widely different constructions in meeting the problem of building a reduced-ply tire.

But a few comparisons can be made. The average four-ply rayon tire uses yarn with a denier of 1,100 or 1,650, though a few intermediate deniers are used. Most nylon four-ply tires use yarn of 840 denier.

The new Firestone two-ply rayon tires use 3,300-denier yarn, and other companies are reportedly using yarns of 1,650 and 2,200 denier. The two-ply nylon tires are reportedly using a 1,680-denier yarn.

Because of the smaller amount of rubber used, tire weights for the two-plies are as much as 7% lower for rayon tires and as much as 10% lower for nylon tires. Yet some two-ply rayon tires are reported to weigh as much as the corresponding four-plies, which would indicate that they contain a greater weight of yarn.

Although cost figures are difficult to obtain, it is estimated that savings may average 4% and may run as high as 10%. Because the reduction in amount of yarn and weight of tire will probably be greatest for the nylon-cord tires, they may produce greater savings than rayon-cord tires. This saving, however, will vary from one tire design to another.

Sidewalls Thinner

As far as the consumer is concerned, the main advantages claimed for the two-ply tire are lower heat buildup and a softer ride. Sidewalls are as much as 25% thinner than in the four-ply tires. The greater flexibility provided by thinner sidewalls, and the lower internal friction produced by two instead of four plies create lower heat buildup. The thinner sidewalls can also dissipate heat faster than in the four-ply tires.

Figures on heat buildup will again vary from construction to construction. However, tests run by E. I. du Pont de Nemours & Co., Inc., on nylon-cord tires indicate that both contained air temperature and shoulder temperature of two-ply tires are 15 to 20 degrees lower than for four-plies. This means fewer failures at high speeds or under severe service conditions. The ability of two-ply tires to operate at higher air pressures also means lower heat buildup, less distortion, and fewer failures.

The greater flexibility of two-ply tires due to thinner sidewalls gives them a lower spring rate and therefore a softer ride, Du Pont tests show. In addition, Du Pont says, flat-spot depth is lower for two-ply tires than for four-plies, and the flat spot runs out more quickly. The company adds that because of the greater flexibility of two-ply tires, axle displacement, or actual amount of bounce transmitted to the automobile by a flat spot, is less.

While this improvement would presumably be the same for both nylon and rayon, flat spotting in rayon is negligible even in four-plies, while it is a severe problem in nylon tires.

Tire construction in truck tires is proceeding along lines similar to those of passenger tires. Truck tires have been reduced over the past half decade from 12 plies, many with two breakers, to 10 plies and now to eight plies. Research is currently going on into the construction of tires with six and even four plies. When it comes to truck tires with their extremely heavy loads, the lower heat buildup produced by reducing plies can be a major factor in reducing tire failure.

U. S. Rubber to Build New Vyrene Plant

United States Rubber Co., New York, N. Y., has announced an expansion program at its Gastonia, N. C., plant which will double production facilities of Vyrene, the company's new Spandex thread. The second expansion of these facilities made during 1961, the plant will be completed by the end of this month.

According to William E. Clark, vice president and general manager, "There will be still further expansions of our Vyrene production facilities in the third and fourth quarters of this year to meet growing demand."

Vyrene, developed in U. S. Rubber's research laboratories during 10 years of research in the field of polyurethane chemistry, is a synthetic elastic thread featuring excellent oxidation and chafe resistance, which can be made in a wide range of sizes, some almost as fine as a human hair.

Current research on Vyrene includes the development of sheer fabrics for dresses, lingerie, ladies' slacks, men's suitings and sportswear.

New Seiberling Plant Opens in Arkansas

Batesville Rubber Co., Batesville, Ark., new subsidiary of Seiberling Rubber Co., Akron O., went into production last month at the newly built plant in Batesville, according to K. Seiberling, general manager of the parent company's shoe products division and president of the new company.

The new $1.4 million plant will employ approximately 100 persons and will manufacture heels, soles, and tire retreading materials. More than 600 items will be produced in the shoe products operation.

Morton Jacobson has joined the staff of RUBBER WORLD as technical editor. Details of Mr. Jacobson's background in the rubber industry will be found in News of the Rubber World, page 8

Polybutadiene Used In Passenger Tire

United States Rubber Co., which recently introduced the first truck tire with a tread of polybutadiene and natural rubber, is now using the stereo rubber for the first time in passenger tires.

The company has put on the market a premium passenger tire with a tread made of a blend of polybutadiene and SBR. The tire gives approximately 60% more mileage than first-line tires made of SBR, U. S. Rubber claims.

While polybutadiene is expected to have considerable use in truck tires because of its high abrasion resistance and low heat buildup, its use for passenger tires has been less certain. This is because the price of the polymer is somewhat higher than that of SBR, 30¢ compared with 24-25¢ for regular grades of SBR and 15¢ for oil-extended grades.

The new tire, the Royal Master, is a low-profile, tubeless tire made in both rayon and nylon cord constructions. In both forms it contains more cords per inch than original equipment tires and has a greater carcass strength, U. S. Rubber said. The four-row tread design, 20% deeper than Tire & Rim Association standards, is designed for longer wear, greater resistance to skidding, and better traction of all road surfaces than original equipment tires, the company announced.

Shell Chemical Co. Expands Styrene Plant

Shell Chemical Co., New York, N. Y., has completed expansion of its styrene production facilities at Torrance, Calif. Styrene is a chemical intermediate used in making plastics and general-purpose synthetic rubber. The expansion raises the plant's capacity to 210 million pounds a year.

Shell has been in the styrene market since 1955, when it acquired the synthetic rubber complex at Torrance from the United States government. The styrene facilities, part of the integrated operation, had a rated annual capacity of 125 million pounds in 1955. Completion of the new program results is a total expansion of nearly 70% since the plant has been in private operation.

Raw materials for styrene are benzene and propane, which are produced in large quantities in southern California by Shell and other refiners that supply the Torrance plant.

Dayco $1 Million Expansion Program

Dayco Corp., Dayton, O., is planning a one-million-dollar expansion program for production, shipping, and warehousing facilities to be completed this year in Springfield, Mo., and Waynesville, N. C., according to an announcement by A. L. Freedlander, Dayco chairman of the board and chief executive officer.

The 52,800-square-foot addition to the Springday Co., a Dayco division in Springfield, will house enlarged laboratory and engineering facilities as well as increased V-belt manufacturing capacity.

At Waynesville the Dayco southern division addition, which will be used for foam latex, urethanes, V-belts, and automotive hose, will include a 60,000-square-foot warehouse and 7,200 square feet of covered dock area. The warehouse building, designed for rapid conversion to a manufacturing facility, will house 4,800 square feet of covered rail dock, and 2,400 square feet of covered truck dock. Capacity will be 21 rail cars and 24 trailer trucks. On completion, Dayco southern division's service facilities will total 8,450 square feet of rail and 4,850 square feet of covered truck dock.

John J. Hall Retires

John J. Hall, initiator of pioneer programs in traffic safety throughout North America and other parts of the world, retired August 1 from the position he held since 1954 as director of the Esso Safety Foundation.

Hall began his career in 1914 in the employ of Ford Motor Co., serving as wholesale manager, service manager, and dealer until 1926, when he joined the Automotive Equipment Association and began to devote most of his time to highway safety. In 1936, following a campaign for improved motor-vehicle safety in New York and other eastern states, Hall joined Pennsylvania officials to develop the first state-wide program for high-school driver education and organized the textbook used for it. Hall was named director of special services for the Association of Casualty & Surety Executives in 1937, and in 1939 he organized the national street and highway safety program of the American Legion and was named its first national chairman.

During World War II, Hall was a special consultant to the Highway Traffic Advisor, Committee of the War Department, and the Office of Defense Transportation. In 1944 he left ACIE to become public relations manager of Atlas Supply Co., worldwide distributor of automotive accessories. Later he became assistant to the president and organized a round-the-world trip of the DC-4 Atlas Sky Merchant.

Hall joined Esso Standard Oil Co. in 1953 and in 1954 was named director of the reactivated Esso Safety Foundation, to implement the goals of the White House Conference on Highway Safety, and to support the highway-safety research and educational programs of schools, colleges, and private and public officials and organizations. In 1957, Hall received the annual Arthur William Memorial Award of the Museum of Safety, for distinguished safety achievement by an individual.

With Hall's retirement, the work of the Esso Safety Foundation will be continued at the Houston, Tex., headquarters of Humble Oil & Refining Co. The name will be changed to the Humble Safety Foundation.

J. J. Hall

Russell DeYoung *(left)*, president of The Goodyear Tire & Rubber Co., Akron, O., presents a tie clasp to W. H. McKenzie, manager of engineered auto products sales, marking McKenzie's 45 years of service with the firm

F. W. Stavely Retires

F. W. Stavely, director of research at the Firestone Tire & Rubber Co., Akron, O., since 1945, retired July 1, after 39 years of service to the firm.

Retirement climaxes Dr. Stavely's lifetime study of the structures and properties of natural and synthetic rubbers. He became interested in rubber in 1917, when he surveyed the status of synthetic rubber as a requirement for a master's degree at the University of Chicago. Stavely's insistence on exploring the use of alkali metals as catalysts led to the discovery of Coral synthetic rubber, the first successful laboratory synthesis of the natural rubber structure. This line of research led not only to the discovery of Coral, a polyisoprene rubber and a complete replacement for natural rubber, but also to the discovery of Diene, a polybutadiene rubber which improves the quality of natural rubber in blends.

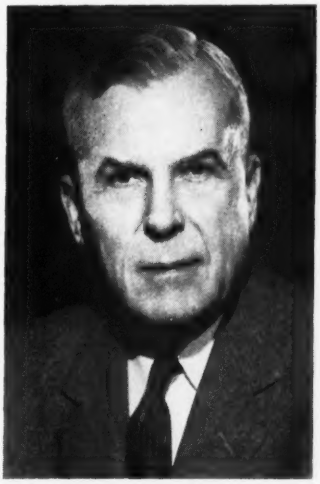
Dr. Stavely joined Firestone in 1922 and from 1928 to 1933 was manager of the laboratory and development departments for the Firestone Tire & Rubber Co. of California; then he returned to Akron as a technical sales representative. He rejoined the California division in 1935 as manager of truck and tractor tire sales and three years later became personnel director for the parent company. He was manager of fuel-cell and oil-cell development during World War II and became director of chemical and physical research laboratories in 1945.

Dr. Stavely earned his bachelor's degree from Sterling College, Sterling, Kan., in 1916, a master's degree from the University of Chicago, and Ph.D. in organic chemistry from Chicago in 1922, and in 1958 he was awarded a D.S. degree from Sterling College.

He was born on July 17, 1894, in Lyndon, Kan.

He has been an active member of the American Chemical Society including its Akron Section and its Division of Rubber Chemistry and is also a member of Sigma Xi, American Association for the Advancement of Science, Division of High Polymer Physics of the American Physical Society, and Institution of Rubber Industry. He is also a Fellow of the American Institute of Chemists and a past chairman of The Los Angeles Rubber Group, Inc.

Ernest T. Handley, formerly executive vice president of the plastics and synthetic fibers division of Firestone and more recently managing director of research, succeeds Stavely as director of research.



F. W. Stavely

Baldwin-Montrose Elects Officers

Herbert J. Siegel and James J. Rochlis were elected chairman and president, respectively, of Baldwin-Montrose Chemical Co., Inc., Philadelphia, Pa., June 27, at the first organizational meeting of the board of directors, following the stockholders' meetings of the constituent companies on May 26 when the merger was approved. Other officers elected were: Harry M. Pryale, vice president, rubber and plastics division; Pincus Rothberg, vice president, chemical division; John L. Reuss, treasurer; and John P. Allison, secretary.

Baldwin-Montrose operates Baldwin Rubber Co. and Montrose Chemical Co. as divisions. The company also controls two major subsidiaries, Mono-Sol Corp. and General Artists Corp. Baldwin Rubber is a supplier of sheet and mechanical rubber goods to the transportation industry. Montrose Chemical Co., with headquarters at Newark, N.J., produces plasticizers and chemical intermediates.

Rubbermaid Bath Line

Rubbermaid, Inc., Wooster, O., made known its plans for expanding its line of bath products at a meeting held at the Sheraton-Blackstone Hotel in Chicago, Ill. New bath accessories shown by the firm included Safti-Grip bathtub and shower-stall mats, a bathtub vanity, a toilet bowl brush in a rustproof caddy, and a laundry dryer for overnight drying of small garments.

Bristol Mfg. Corp. To Build New Plant

Maurice C. Smith, Jr., chairman of the board, Bristol Mfg. Corp., Bristol, R. I., led the ground-breaking ceremonies on June 1 for the firm's new 15,475-square-foot building which will be used primarily to allow for expansion of making and packing operations, utilizing additional equipment, and the most up-to-date techniques in the manufacture of fabric and waterproof footwear. Construction of the new facilities will proceed immediately, with occupancy expected this coming October.

(Left to right) **Arthur J. Levy, secretary and a director of Bristol Mfg. Corp.; William H. Smith, president and treasurer, and George T. Helm, a director, watch Chairman Maurice Smith breaking ground for new plant**

news briefs

Flexible Tubing Corp., Guildford, Conn., has developed a new trademark designed in the form of an ellipse or tilted oval, which combines the company's initials on a light-blue background. A dark-blue speed shaft crosses the "t" and forms the lower bar on the "f"

ENJAY CHEMICAL CO., a division of Humble Oil & Refining Co., New York, N. Y., has announced that the plastic-producing capacity of its parent company's polyolefin plant in Baytown, Tex., is currently being expanded by approximately 50% from an initial rated capacity of 40 million pounds per year.

THE B. F. GOODRICH CO., Akron, O., has replaced its Aviation Products division with a division of Aerospace and Defense Products, which will bear company-wide responsibility for direct contract sales to the Defense Department and other federal agencies.

AVISUN CORP., Philadelphia, Pa., has begun initial equipment testing of its new 100-million-pound-per-year polypropylene plant. Located on a 214-acre site at New Castle, Del., the multi-million dollar plant will make the company one of the largest polypropylene producers in the world.

J. M. HUBER CORP., New York, N. Y., has named L. V. Lomas Chemical Co., Ltd., 2633 Jane St., Downsview, Ont., Canada, exclusive distributor for Huber specialty kaolin clays and Zeolex synthetic silica pigments to the paint, varnish, printing ink, plastics and allied processing industries in the provinces of Quebec and Ontario. The Huber products will be warehoused in Quebec at St. Lawrence Warehouse, Inc., P. O. Box 215, Place D'Armes, Montreal 1, P. Q., and in Ontario at Terminal Warehouse, Ltd., Foot of York Street, Toronto, Ont.

E. I. DU PONT DE NEMOURS & CO., INC., Wilmington, Del., will expand the output of titanium dioxide pigment at its New Johnsonville, Tenn., plant by 30% in the next 12 months.

FRICTION MATERIALS STANDARD INSTITUTE, INC., New York, N. Y., has elected the following officers: James L. McGovern, Jr., (Raybestos-Manhattan, Inc.), president; S. Arthur Smith (Silver Line Brake Lining Corp.), vice president; Harold Hodson (Bendix Corp., Marshall-Eclipse Division), treasurer; and Miss Harriet G. Duschek, secretary. Other members of the board of directors serving with these officers are: George S. Lamson (L. J. Miley Co.); Alexander Bette (Johns-Manville Corp.); John H. Kelly (Bendix, Marshall-Eclipse Division); Joseph Greenan (World Bestos Division, Firestone Tire & Rubber Co.); and Wade E. Canfield (S. K. Wellman Co.).

SPRAYLAT CORP., New York, N. Y., is moving its manufacturing plant to larger quarters at 730 S. Columbus Ave., Mt. Vernon, N. Y.

CARY CHEMICALS, INC., New Brunswick, N. J., has approved Phase III of its expansion program, which involves a $14-million investment in new production facilities including the construction of a new polymer plant designed to produce 150 million pounds per year of poly(vinyl chloride).

GENERAL ELECTRIC CO., silicone products department, Waterford, N. Y., has opened a new sales office at 11 W. Monument St., Dayton, O.

INTERNATIONAL LATEX CORP., chemical division, Dover, Del., has appointed O'Connor & Co., Inc., Chicago, Ill., sales representative for Tylac latices in Illinois, Indiana, and lower Michigan.

ANCON CHEMICAL CORP., a new petrochemical company recently formed as a jointly owned subsidiary of Ansul Chemical Co., Marinette, Wis., and Continental Oil Co., Houston, Tex., will construct a $1,000,000 plant at Lake Charles, La. The new plant's output of methyl chloride is expected to be used primarily by manufacturers of butyl rubber, tetramethylead, silicones, methyl cellulose, and quarternary ammonium compounds.

(*Continued on page 104*)

Taking part in ground-breaking ceremonies for Cabot Corp. West Coast distribution center are *(left to right)* Raoul Dedeaux, former major league baseball player from whom the warehouse will be leased; Donald Simonds, Cabot's West Coast regional sales manager; and Charles Ashcroft, assistant regional sales manager. The warehouse, to be located in Vernon, Calif., will service Southern California and is expected to be completed soon

news about people

Allan F. Kingsley has been appointed head of the technical division, Neville Chemical Co., Pittsburgh, Pa., manufacturer of resins, solvents, and plasticizers. In his new post, Kingsley will be in charge of analytical activities.

Joachim H. Becker has joined the chemicals division of J. M. Huber Corp., New York, N.Y., in the newly created position of engineering development manager. He will headquarter at Havre de Grace, Md.

C. B. McKeown, general manager of the Aviation Products Division of The B. F. Goodrich Co., Akron, O., has been appointed general manager of the new Aerospace and Defense Products Division.

A. F. Kingsley

C. D. McCleary

R. A. Harris

J. H. Becker

C. B. McKeown

B. S. Garvey, Jr.

Charles D. McCleary has been named director of research and development for Naugatuck Chemical Division, United States Rubber Co., New York, N. Y. Formerly assistant director, he succeeds **Wesley S. Coe,** recently elected managing director of Pertroquimica, S.A. (PASA).

W. Kenneth Hill has been assigned as a technical sales representative in the New England sales region of Union Carbide Plastics Co., division of Union Carbide Corp., New York, N. Y. He will be located in the company's Boston district sales office at 300 First Ave., Needham Heights, Mass.

Gaillard A. Mervin, Robert E. Mann and **E. Reilly Scott** have been appointed regional sales managers by Southern Latex Corp., Austell, Ga., to cover the North Carolina, north Georgia, and southwest areas, respectively.

James W. Smith has been appointed sales representative in the southeastern portion of the United States for Aldan Rubber Co., Philadelphia, Pa.

D. O. Grimm, veteran official of O'Sullivan Rubber Corp., Winchester, Va., has been elected treasurer of Gulfstream Plastics, Inc., a wholly owned subsidiary of O'Sullivan. He will fill the position vacated by the death of **Frank Mueller** on June 6. Gulfstream Plastics, located in Hialeah, Fla., was purchased by O'Sullivan Rubber last December.

Roland A. Harris has been made vice president—marketing of B. F. Goodrich Canada, Ltd., Kitchener, Ont., Canada.

Thomas E. Cook has been named vice president of Westwood Chemical, Inc., Cleveland, O., with headquarters in Akron, O. He will handle sales and promotion to the rubber industry and allied trade for Northco Chemical, Painesville, O., and for Tumpeer Chemical Co., Chicago, Ill.

William C. Douce, assistant manager, rubber chemicals sales division, Phillips Chemical Co., has been made Assistant Director for Mobilization Planning, Chemical & Rubber Division, Business & Defense Services Administration, United States Department of Commerce, Washington, D. C. He will serve under an arrangement by which industry makes available key men for temporary service without government compensation.

Darwin E. Rhoads has been made corporate safety engineer for AviSun Corp., Philadelphia, Pa., a position entailing overall staff responsibility for safety programs throughout the corporation.

Charles McCoy has joined the production department of Mobay Chemical Co., Pittsburgh, Pa., at its New Martinsville, W. Va., division as a technical assistant to the plant supervisor.

Benjamin S. Garvey, Jr., has been named manager of rubber chemicals, Pennsalt Chemicals Corp., Philadelphia, Pa., and will headquarter at the firm's new technical service laboratories in King of Prussia, Pa. He succeeds the late **George G. Klein.** Garvey will be responsible for rubber chemical sales and for technical services to the rubber industry.

J. P. Anderson has been named chairman of the board of Dunlop Canada, Ltd., Toronto, Ont., Canada. He succeeds **Sir G. Edward Beharrell,** chairman of Dunlop Rubber of England, who remains a director of the Canadian firm. **G. F. Plummer,** formerly executive vice president, has been appointed president of Dunlop Canada.

R. K. Turner has been elected a vice president of Union Carbide Corp., New York, N. Y., and **William B. Humes** was appointed president of Union Carbide Plastics Co., division of the corporation.

Arnold E. Boedeker, director of art and exhibits for The Goodyear Tire & Rubber Co., Akron, O., retired July 1, after more than 45 years' service.

W. L. Van Nostrand, Jr., has joined the Enjay Laboratories, Linden, N. J., where he will conduct application and technical service work on Buton resins.

news about people

W. L. Batty, Jr., has been named manager of the western district of the silicone products department of General Electric Co., Waterford, N. Y. His office will be located in Downey, Calif.

Carl W. Meyers was appointed works manager of the North Tonawanda, N. Y., plant, Durez Plastics Division of Hooker Chemical Corp., New York, N. Y., effective July 1.

James McWhirter, general manag r of industrial chemicals division, Penr salt Chemicals Corp., Philadelphia, Pa., has been elected a vice president of th company.

W. L. Batty, Jr.

G. W. Sadler

R. H. Roberts

J. H. Morrison

J. McWhirter

George W. Sadler has been named technical representative of the Natural Rubber Bureau, Washington, D. C. Sadler, who joined the Bureau on July 1, spent a month in orientation meetings at the natural rubber industry laboratories at Welwyn Garden City, just outside London, England. He will call on rubber manufacturers from the Natural Rubber Bureau's new branch office in New England.

Donald M. Mahady is now belting product manager of the Boston Woven Hose & Rubber Division, American Biltrite Rubber Co., Cambridge, Mass. Mahady succeeds **W. J. Potter,** who resigned to take a position in another industry.

Frank B. Knight has been made vice president, and **G. Edward Ammerman** general sales manager of Chromalox, Inc., Murfreesboro, Tenn., a subsidiary of Edwin L. Wiegand Co., manufacturer of electric heat equipment.

Claude H. Allard has been appointed director of marketing of the Naugatuck Chemical Division, United States Rubber Co., New York, N.Y., succeeding **Harold M. Parkekian,** now associated with Masters Chemcal Co., Toledo, O.

Bailey K. Howard, president of Field Enterprises Educational Corp., Chicago, Ill., and **Frank Markoe, Jr.,** vice president of Warner-Lambert Pharmaceutical Co., Morris Plains, N. J., were elected directors of General Aniline & Film Corp., New York, N. Y.

Carl E. Hopkins has been appointed chief chemist for Metal Hose & Tubing Co., Dover, N. J., a subsidiary of Dayco Corp. In his new post, Hopkins will be responsible for research development, quality control, and general supervision of the laboratory staff.

Richard H. Roberts, Jr., is now manager of the Borger, Tex., laboratory of J. M. Huber Corp., New York, N. Y. The Borger laboratory is engaged in research and technical service for Huber's carbon black, kaolin clay, and chemical products.

H. E. Dieckman

H. G. Johnson

Harry E. Dieckman has joined The Bearfoot Sole Co., Inc., Wadsworth, O., as special assistant to the vice president, manufacturing.

H. E. Hughes, manager of the polyisoprene rubber plant of Shell Chemical Co., New York, N. Y., now under construction near Marietta, O., has been named manufacturing manager of the synthetic rubber division, succeeding **R. L. Kittle,** who has accepted a senior position with an overseas company. Hughes' former position will be occupied by **G. A. White,** presently superintendent of operations for the Marietta plant.

Harold F. Nunn, formerly vice president-general manager and a director of H. K. Porter Co., Ltd., has been elected a vice president of The Eagle-Picher Co., Cincinnati, O.

James Hamlin has been made sales representative in charge of the new silicone products department sales office of General Electric Co. in Dayton, O.

James H. Morrison has been mad sales representative for the wester sales district of the silicone prod ucts department of General Electri Co., Waterford, N. Y., with headquar ters in Downey, Calif.

Hugh G. Johnson, 84, director of Johnson Rubber Co., Middlefield, O., retired recently from the post he held 63 years. Friends and associates honored him at a luncheon, when he received a plaque commemorating his many years of service as an officer and a director of the company. Mr. Johnson is also president of Toledo Rubber Products Corp.

John B. Winkler, Peter M. Heard, and **David H. Hess, Jr.,** have been assigned as resident butyl latex representatives to the eastern, central, and western marketing divisions, respectively, of Enjay Chemical Co., New York, N. Y.

Andrew J. McNeill has been appointed divisional purchasing agent for the Naugatuck Chemical Division, United States Rubber Co., Naugatuck, Conn. In his new post he will supervise all purchases for the Division.

Joseph W. Schinzing has been named sales representative in the Midwest for the chemicals and plastics division of Food Machinery & Chemical Corp., New York, N. Y.

Richard J. Kerr has been appointed product manager for epoxies and plasticizers in the new chemicals group of Union Carbide Chemicals Co., New York, N. Y.

John H. Peterson has been named sales manager of the tire valve division of Bridgeport Brass Co., Bridgeport, Conn.

(Continued on page 122)

obituaries

R. K. Turner

R. K. Turner, a vice president of Union Carbide Corp., died suddenly on July 8 at his home in Larchmont, N. Y.

After receiving B.S. and M.S. degrees in Chemical Engineering from Massachusetts Institute of Technology in 1923 and 1924, respectively, Turner joined Union Carbide Chemicals Co. at Clendenin, W. Va. He moved to the Union Carbide plastics company in 1952 as a vice president and was appointed president of that division in 1957. In June, 1961, he was elected a vice president of Union Carbide Corp.

Turner was a member of the American Institute of Chemical Engineers, Pinnacle Club, Larchmont Yacht Club, Larchmont Volunteer Fire Department, Larchmont Manor Society, the M.I.T. clubs of New York and Westchester, Newcomen Society, and the New England Society.

He was born in Newton, Mass., in 1902.

He is survived by his wife, a son, four daughters, three brothers, and 14 grandchildren.

Ernest I. Kilcup

Ernest I. Kilcup, 70, president, treasurer, and board chairman of Davol Rubber Co., Providence, R. I., died on July 10 at his home in Barrington, R. I., after a business career which encompassed 43 active years of service.

Dr. Kilcup joined Davol in 1918 and was made credit manager in 1921. In 1928 he became assistant secretary-treasurer; a director, secretary, and acting treasurer in 1930; managing executive in 1932; and president in 1937.

A graduate of Brown University, Providence, R. I., and Providence Public schools, Dr. Kilcup engaged in many educational, humanitarian, and philanthropic activities during his business career. He taught economics, marketing, and financial management at Northeastern University and in his later years received honorary degrees from several colleges, including a Doctorate of Science from the Rhode Island College of Pharmacy, now a division of the University of Rhode Island.

The deceased was a trustee of Bryant College and of the Osteopathic General Hospital of Rhode Island. Among the organizations of which he was a

Ernest I. Kilcup

director are the Citizens Savings Bank, the Automobile Mutual Insurance Co. of America, the Factory Mutual Liability Insurance Co. of America, and C. R. Band, Inc., Summit, N. J., a surgical supply house.

Upon his recent retirement as a director of the Emma Pendleton Bradley Hospital, Dr. Kilcup was cited for unselfish service to that institution. Kilcup was also an active member of various credit, commerce, and fraternal associations.

The deceased was born in Providence, R. I., on January 27, 1891.

He is survived by his wife, a brother, and a sister.

He was buried on July 13, at the Princess Hill Cemetery, Barrington, R. I. A memorial service was held on July 14.

Theron R. Palmer

Theron R. Palmer, founder, former president (1903-1947), and board chairman (1947-1961) of Continental Rubber Works, Erie, Pa., died July 5 after a long illness.

Palmer began his career in the rubber industry at the age of 16 with The B. F. Goodrich Co. in Akron, O., where he gained seven years of valuable experience. In 1900 he joined Pennsylvania Rubber Co., Jeannette, Pa., as general manager, but resigned in 1903 to start his own company, The Continental Rubber Works, with a plant in Erie, Pa. Under Palmer's direction, the company attained considerable eminence in the rubber industry as producer of molded and extruded rubber parts, tires and tubes, industrial and contractors' hose, and various synthetic rubber products.

Palmer was born in Edinburg, O., in 1877.

He is survived by his wife, a daughter, and a son.

Vincent Madsen

Vincent Madsen, 48, managing director of plantations in Malaya and Sumatra for United States Rubber Co., and an expert on Far East rubber, production, export, and financing, died of a kidney ailment on July 23 in a New York, N. Y., hospital.

Madsen started with the company as a junior auditor in 1937, after holding positions with several banks and trust companies. In 1938, he was sent to Sumatra as an accountant. When the Japanese captured the island in 1941, he was interned along with other rubber company officials for a period of 3½ years, during which the group managed to subsist by smuggling seeds into their compound and growing a few vegetables.

After his release, Madsen was assigned to the company's New York headquarters for a year; then he returned to the Far East as chief accountant for operations in Malaya. He held various positions with the company and was appointed general manager of Malayan American Plantations, Ltd., and then head manager of P.T. United States Rubber Sumatra Plantations, both subsidiaries of U. S. Rubber.

In 1954 the deceased was named managing director of the plantation division and since then divided his time between the general offices in New York and the Far East.

Madsen was graduated from New York University in 1932 with a master's degree in economics and also studied at the Harvard Business School. He was a director of the American Indonesian Chamber of Commerce and a member of the Harvard Advance Management Association.

The deceased was born in Brooklyn, N. Y., on November 26, 1912.

Services were held July 26 in New York, followed by interment at Ferncliff Cemetery, Hartsdale, N. Y.

He is survived by his wife.

William S. Wolfe

William S. Wolfe, former director of domestic production for The Goodyear Tire & Rubber Co., Akron, O., died June 30 at the age of 70 at Delray Beach, Fla., where he and his wife had lived since his retirement in 1959.

A graduate of Marietta (Ohio) College and Massachusetts Institute of Technology, Wolfe joined Goodyear's development department in 1912 and was made chief development engineer three years later. In 1922 he became vice president and factory manager of Seiberling Rubber Co., Barberton, O. Returning to Goodyear in 1934, Wolfe was engaged in sales work, principally on truck tires. He rejoined the factory organization as manager of development in 1937 and was appointed factory manager in 1939 and director of production for all Goodyear domestic plants in 1937.

Services were held in Akron on July 5.

He is survived by his wife and a son.

Earl Antrim

Earl Antrim, an extruded goods cost estimator for Yale Rubber Mfg. Co., Sandusky, Mich., died of a heart attack on July 21 while on vacation.

He was a member of Friends Memorial Church, Muncie, Ind.

Antrim was born on May 17, 1907, in Yorktown, Ind., where burial took place in Hawk Cemetery.

He is survived by his wife, two sons, two daughters, three brothers, and nine grandchildren.

A. S. Bishop

A. S. Bishop, former board chairman of the Goodyear Tyre & Rubber Co. (Great Britain Ltd.), died during surgery on July 10 in Eastbourne, Sussex, England, at the age of 68. Bishop retired from active service with the company in 1959, but continued as a director until his death.

He became associated with Goodyear in 1916, following action in France during World War I. Initiating his career as a clerk in the solid tire department at the Manchester branch, he was made manager of solid tire sales in London, in 1919. During this period of Goodyear history, when giant pneumatic tires were being introduced in the United States, Bishop came to Akron, O., to learn about this revolutionary development. He returned to Great Britain to pioneer fitting of these tires to public service and transport vehicles, and within a few years giant tires were a familiar sight on the streets of England. In 1922, Mr. Bishop was named assistant to the sales manager of Good-

A. S. Bishop

year-Great Britain and four years later was appointed manager of the commercial tire department. He was made general sales manager in 1933 and advanced to the position of sales director in 1936, continuing in that capacity until being named managing director in 1954. He became chairman of the board in 1957.

The deceased was born in Tring, England.

He is survived by his wife, a daughter, and two grandchildren.

Washington Report

(*Continued from page 95*)

the record documents going back as far as 1923, a move that produced protests from tire company attorneys who claimed they had been led to believe that only the period from 1950 would be covered in the submission of evidence and testimony.

Kelaher charged that a system of "price leadership" exists in the tire industry. The way it worked, he said, was usually by the announcement of one of the leading tire manufacturers of a coming rise in prices. Other companies thereupon followed suit and adjusted their own prices simultaneously after the "leader" had given the signal.

The FTC attorney also suggested that tire companies allocated markets and conspired to rig bids on government procurement operations. He cited code names indicating that they were used when bids to the Federal Government were involved; among them were "Soldier & Ralph" for General Tire & Rubber; "Canfield & Andrew" for Goodyear; "Stoneman & Daniel" for Firestone, and so on.

Kelaher alleged that the tire manufacturers agreed to allocate state business among themselves and would designate certain companies to bid higher than the companies to which the business had been "allocated." He also charged that the Big Four used net price lists resulting in generally identical prices although, by prior agreement, other companies had lower prices. This, he claimed, was part of the RMA's "uniform system of accounting" which FTC alleges was used by all rubber companies as the standard for setting tire and tube prices.

FDA Suspends Penalty On Labeling Act

The Food & Drug Administration announced suspension of penalty provisions of the Federal Hazardous Substances Labeling Act until February 1, 1962, for all hazardous substances other than highly toxic, extremely flammable and flammable.

On January 31, FDA extended the effective date of the enforcement provisions of the Act until August 1, 1961, except for those products.

The Act became enforceable February 1, 1961, but authorized the Department of Health, Education & Welfare to extend the effective date for not more than 18 months.

On April 29, 1961, proposed regulations were published in the *Federal Register*, and comments were requested thereon. Numerous comments were received from associations, firms, and individuals during the 60 days specified for submitting comments. In addition, an open meeting was held on July 13 and 14, 1961, at which time oral statements were received.

Deputy Commissioner of Food & Drugs John L. Harvey said that "time will be required to consider all the comments received and to issue final regulations."

Therefore, the time of enforcement was extended.

The Federal Caustic Poison Act remains in full force and effect during the period of this extension.

News Briefs

(*Continued from page 100*)

O'SULLIVAN RUBBER CORP., Winchester, Va., and A. L. GEBHARDT CO., Milwaukee, Wis., have announced their association in a marketing and technical service arrangement which will cover Wisconsin, Minnesota, Illinois, Michigan, Iowa, and Nebraska.

IMPERIAL COMMODITIES CORP., New York, N. Y., will conduct all its rubber business through its wholly owned subsidiary, Alan L. Grant Co., Inc., New York, N. Y.

international picture

Retreading Industry Developing in Vietnam

In line with the program for a balanced economy for Vietnam, new industries are gradually to be introduced, including the manufacture of rubber goods. Since most of the raw materials as well as qualified labor are available, a large part of the 5,000 to 6,000 tons of rubber goods imported annually could well be made locally, and some may even be exported. The imports of rubber goods include about 400,000 tires yearly for automobiles and trucks for military and civilian purposes.

Though for the time being domestic tire production is not feasible, good progress has already been made in tire retreading, and actual capacity is now put at some 32,000 units a year. One enterprise, described in an article in *Revue Générale du Caoutchouc,* (March, 1961, p. 334), started as a small shop in 1959 and is now a modern factory equipped with German machinery. It handles tires up to 12.00 x 20 and in 1960 produced more than 12,000 retreads.

An interesting development in retreading in Vietnam is the growing use of compounds made with red clay-rubber masterbatches. Experiments on a small scale were first made in 1954, but it was not until 1959 that the new compound began to catch on, and by the end of 1960 more than 30,000 recaps were made with it.

The red clay, consisting essentially of iron hydroxide and kaolinite, occurs abundantly in many of the important rubber plantation areas, and the masterbatches are prepared by coflocculation of a suspension of the clay and latex. TL-100 masterbatches, containing 100 parts of clay to 100 parts of rubber, are commercially available and have been found suitable for use in tread compounds; the red clay replaces carbon black as the reinforcing filler. Recaps made from red-clay masterbatches have proved satisfactory in road tests, under the difficult Vietnam conditions.

Semperit Dominates Austrian Industry

As a result of the merger policy of the leading Austrian firm, Semperit Oesterreichisch-Amerikanische Gummiwerke A.G., all but about 8% of the country's output of rubber goods is now concentrated in this one company so that for all practical purposes Semperit stands for the Austrian rubber industry.

In 1960 the country's consumption of rubber totaled 18,906 tons, including 10,863 tons of natural rubber and 8,043 tons of synthetic rubber, as compared with 18,247 tons in 1959, including 11,506 tons of natural rubber and 6,741 tons of synthetic rubber. Production of rubber goods totaled 43,700 tons in 1960, against 34,652 tons the year before; tires represented 20,000 tons, against 16,960 tons.

Semperit's expansion program calling for substantially increased facilities for tire manufacture as well as for new factories for footwear and hose (now under construction) is calculated further to accelerate the rate of progress in Austria.

Both imports and exports increased in 1960; the value of imports rose from 120,400,000 schilling in 1959 to 156,100,000 schilling last year; while exports went up to 264,100,000 schilling from 208,300,000 schilling.

The countries of the Common Market supplied the greater part of the imports (59% in 1960 and 69% in 1959), but also were the best customers for Austrian rubber goods, taking 44% in 1960, against 39% in 1959.

NR Only 60% of New Rubber Used in Italy

Out of the total 111,095 tons of new rubber consumed by the Italian rubber industry in 1960, 44,104 tons, or almost 40%, was synthetic rubber. By far the greater part of the synthetic tonnage—33,699 tons—consisted of SBR and SBR latex; the rest included 5,191 tons of butyl rubber, 4,064 tons of neoprene, and 1,150 tons of nitrile rubber.

The following table gives the amounts of natural and synthetic rubber (including latices) consumed by the main branches of the industry last year:

	Synthetic Rubber	Natural Rubber
Tires *tons.*	26,237	43,529
Footwear	1,071	3,128
Heels and soles	1,680	966
Cables	5,378	721
Other rubber goods	9,738	18,647
Total	44,104	66,991

In addition to the new rubber, Italy used 10,791 tons of reclaim, half of which was taken by the tire industry.

Houdry Butadiene Unit Licensed in Brazil

Houdry-Brazilian Co. has licensed Petroleo Brasileiro, S.A., (Petrobras) to construct a 29,000-metric-ton-per-year dehydrogenation unit near Rio de Janeiro, according to a license agreement signed recently by Geonisio Carvalho Barroso and Theodore A. Burtis, presidents, respectively, of Petrobras and Houdry.

The plant will be situated at Petrobras' synthetic rubber complex now under construction at Duque de Caxias and will have the flexibility to produce butadiene, the principal ingredient in synthetic rubber, from normal butane or mixtures of butane and butenes. Feedstocks for the Houdry dehydrogenation plant will be furnished by Petrobras' new refinery, also at Duque de Caxias.

Besides the dehydrogenation unit, Petrobras has licensed two large Houdriforming units now under construction near Rio de Janeiro and Sao Paulo.

Du Pont To Build Plant In Northern Ireland

A multi-million dollar plant for the manufacture of isocyanates, a basic raw material used in the production of urethane foams, will be built by Du Pont Co., (United Kingdom), Ltd., on its plant site at Maydown, near Londonderry, Northern Ireland, according to William H. McCoy, managing director of Du Pont's British subsidiary.

This new facility will supply "Hylene" organic isocyanates, used in making both rigid and flexible urethane foams, for markets in the United Kingdom and for export to other countries in the Free Trade area. The second manufacturing unit to be built by Du Pont (United Kingdom), it will be located adjacent to the company's neoprene synthetic rubber plant. Construction will begin later this year under the supervision of Du Pont engineers, and the plant is expected to be in operation late in 1963. Until the new facility at Londonderry is completed, isocyanates will continue to be exported to European customers from the plant of E. I. du Pont de Nemours & Co., Inc., in the United States.

Goodyear to Build Tire Plant in Turkey

The Government of Turkey has granted the Goodyear Tire & Rubber Co. authorization to form a $13,000,000 company, Goodyear Lastikleri Turk Anonim Sirketi, in association with local interests, for the purpose of building a tire factory. Under terms of the authorization, the installation, which will employ approximately 300 persons, must go into production within two years. Initial capacity will include a complete line of passenger, truck, and agricultural tires and tubes, as well as tread rubber and other tire repair materials.

Construction of this plant will increase the number of Goodyear international manufacturing operations to 37.

C. H. M. Baker

FBRAM Elects Officers

C. H. M. Baker, a director of the Firestone Tyre & Rubber Co., Ltd., and former vice president of the Federation of British Rubber & Allied Manufacturers, was elected president of FBRAM at the annual general meeting held on July 7.

Baker was a founder member of the rubber industry's Materials Supply Committee, of which he became chairman at the end of 1959. He was also one of the prime movers in the worldwide campaign for the more orderly and reliable marketing of natural rubber, and leader of the British rubber industry's delegation to the Third International Rubber Quality and Packing Conference in Singapore in 1960. He is an industry advisor to the Board of Trade's representatives on the International Rubber Study Group.

Two vice presidents elected at the same FBRAM meeting were D. E. Cameron, chairman and managing director of B. B. Chemical Co., Ltd., and chairman of the Sealant Manufacturers' Conference of the FBRAM; and D. D. Marshall, managing director of the Greengate & Irwell Rubber Co., Ltd., and chairman of the British Rubber & Plastics Belting Manufacturers' Association.

French Mono-Rail and Subway Rubber-Tired

In France the attempt is being made to solve the problem of providing rapid, comfortable, and economical transportation for passengers in crowded cities, by a system of overhead transit employing suspended rubber-tired trains. The system, which eliminates the disadvantages of the noise and unsightliness of the usual type of elevated railway, has been in service since 1960 on an experimental line, one kilometer long (0.62-mile) near Orleans. The car in use is intended to carry 32 persons seated and 91 standing; it is suspended from two bogies equipped with four supporting and driving wheels, and four guide wheels, fitted with Michelin X-type tires, 1200 x 20, inflated with nitrogen at 9 kg/cm^2. The track is a metal box girder strong enough to allow supports to be spaced 100 feet apart.

The design of the track not only permits a neat appearance by concealing bogies, races, power supply, and signaling devices, but also protects these parts against weather.

Pneumatic-tired subway trains were first run experimentally in Paris in November 1951; then five years later all the trains for the 6.5-km. Chatelet-Porte des Lilas line were mounted on pneumatic tires.

Apparently the results sought by the use of pneumatic tires—increased riding comfort, reduced weight of material, improved starting and braking performance—have been satisfactorily achieved, for the trains for the 15-km., Pont de Neuilly—Porte de Vincennes (Paris) subway line, now under construction, are also to be equipped with pneumatic tires. The first of these trains is expected to be in service by 1963; when the line is completed at the end of 1964 it will require 52 trains of five cars each, or 260 cars in all.

German Machinery Output Increases

The value of German output of machinery for the rubber and plastics industries more than doubled in the period 1957-1960 (inclusive), from 180,600,000 DM. to 362,000,000 DM. The increase in the value of machinery exports during the same period almost paralleled the growth of production; the respective amounts for 1957 and 1960 were 86,200,000 DM. and 150,500,000 DM. The ratio of export to output value however, was 42.5% in 1960, against 47.7% in 1957.

Practically every type of machine appears to have made marked gains in the period considered, though an analysis of the data points up very clearly how much the 1960 results owe to the rapid expansion of the plastics industry. Thus the value of extruders produced went up from 29,900,000 DM. in 1957 to 64,700,000 DM. in 1960; while that of injection molding machines (not including molds) climbed from 31,600,000 to 98,800,000 DM. In the case of machinery specifically for the rubber industry, a comparable advance, but at lower level, was made by equipment for retreading and repairing tires (from 7,700,000 to 17,900,000 DM.) and vulcanization installations (from 7,700,000 to 15,300,000 DM.).

French Rubber Exports Climb 800% in Decade

French exports of tires and industrial rubber goods rose approximately 800% between 1950 and 1960, according to figures in the April, 1961, issue of *Revue Générale du Caoutchouc*.

The breakdown shows that tire exports quadrupled during the period, and exports of industrial rubber goods increased 10 times.

Figures show that exports climbed only moderately from 1950 to 1957, when the French industry was resuming and consolidating its position in the world market following World War II, then skyrocketed from 1957 to 1960.

Tire exports were 8,578 tons, with a value of 3,351 million old francs in 1950. By 1957 they were 15,897 tons, value, 7,599 million old francs. In 1960 they reached 32,738 tons, value, 19,584 million old francs.

Exports of industrial rubber goods rose from 1,702 tons, value, 953 million old francs, in 1950, to 4,410 tons, value, 2,373 million old francs, in 1957. By 1960 they reached 15,100 tons, value, 10,196 old francs.

The Common Market agreement, which went into effect in 1958, undoubtedly played its part in the upsurge of exports between 1957 and 1960. Data for distribution of exports by trade areas reveal that members of the Common Market bought 15% more French rubber products in 1958 than in 1957, 93% more in 1959 than in 1958, and 74% more in 1960 than in 1959. Since many French tire manufacturers have branches in other Common Market countries, the bulk of the increase in exports to Common Market countries was in industrial rubber goods.

Exports to countries outside the Common Market also increased, but only at about a 33% annual rate in 1959 and 1960.

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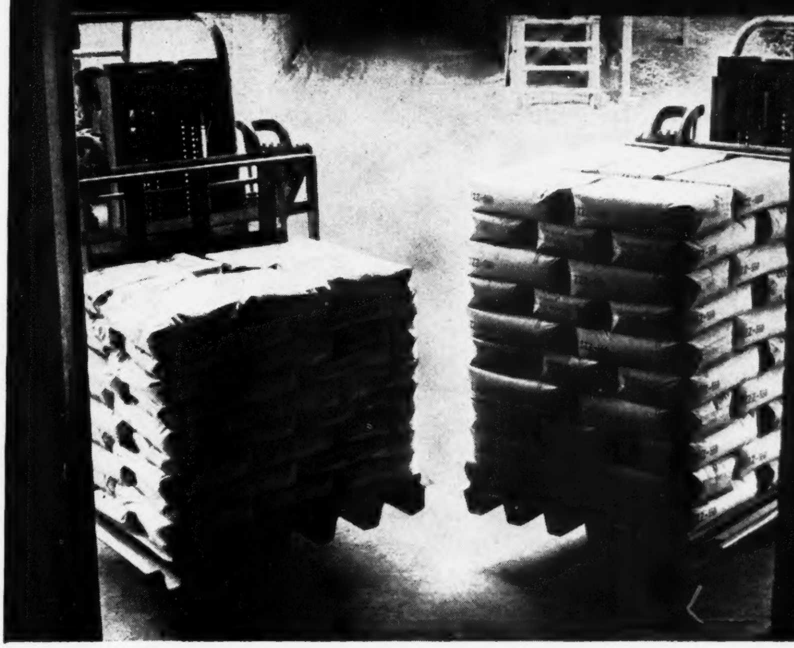

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Sir Geoffrey Clay Plans To Retire

Once more Malaya is looking for a "Superman" of the rubber industry, to steer research. The present Controller of Rubber Research, Sir Geoffrey Clay, is to retire in March, 1962, when he will have served three years in Malaya. Sir Geoffrey, 65, has turned down an offer to extend his contract because he fears the strain of continued work in the tropics at his age. Sir Geoffrey is not only Controller of Rubber Research, but also chairman of the boards of the Natural Rubber Bureau, Natural Rubber Producers' Research Association, The Rubber Research Institute of Malaya, and the Malayan Rubber Fund.

The important post of representative for the Malayan Rubber Fund Board in London will be vacated by E. Jago, at the end of next year, and a secretary of the Treasury, Lim Kim Cheng, is being trained to take his place.

Market Sought for Low-Temperature NR

A crystallization-inhibited natural rubber has been developed which has excellent low-temperature qualities, both in the raw and vulcanized states, L. Bateman, director of the Natural Rubber Producers Research Association, reported to the coordinating advisory committee of the Malayan Rubber Fund Board.

At present the NRPRA remains the only source of supply of the dry rubber, and 200-pound batches can be made as required, Dr. Bateman reported. One drum of crystallization-inhibited latex has been received from the Rubber Research Institute for a British firm which showed interest in a low-temperature latex.

U. S. firms interested in a crystallization-inhibited rubber should get in touch with Dr. W. E. Cake, vice president, United States Rubber Co., New York, N. Y., who has been asked by the coordinating advisory committee to determine potential interest in the new rubber here.

Crystallization of the rubber is inhibited by introducing irregularity in the rubber molecule without modifying the molecule to such an extent that crystallization is prevented on stretching. Thus tensile properties are not affected.

This was originally accomplished in NRPRA research by using thiol acids with large substituent groups, such as thiolacetic and thiobenzoic acids, achieving the reaction on the mill or in an internal mixer. Dr. Bateman also reported that 2-3% of thiol acid was required to reduce the rate of crystallization about a hundred times. The product, however, was prone to scorch and suffered considerable peptization. No such bad effects were found in latex, on the other hand, and the reaction was even more efficient; 1% of thiol acid reduced the rate of crystallization 1,000 times.

The reaction in latex was so efficient that another explanation of its effect was sought for, and research showed that some *cis-trans* isomerization was taking place. With this knowledge, an alternative reagent for inducing this isomerization was found in sulfur dioxide, introduced into rubber in mixers or extruders as the crystalline butadiene sulphone, which liberates sulfur dioxide on heating. This method is used for dry rubber, but the thiol acid method is still used for latex.

Material and processing costs are estimated at one shilling-sixpence to two shillings (21-28¢) per pound for the latex process, and one shilling-sixpence (21¢) for the dry rubber process, Dr. Bateman reported.

Smallholders Up Share In Liberia Production

The smallholder share in production of Liberian natural rubber production is expected to increase significantly in coming years, as smallholder trees mature, the United States Department of Commerce reports.

Total production of natural rubber in Liberia in 1960 was 43,050 long tons, compared with 42,800 long tons in 1959. This year production is expected to increase again, to 44,200 long tons.

Production by smallholders increased from 12% of the total in 1958 to 13.3% in 1959 and 15.5% last year. The bulk of smallholder producing trees, however, was in the very early period of their productive life, according to the Department of Commerce.

The figures show the story. Of the 191,932 acres of land in rubber production, 105,132 were on plantations and 86,800 in small holdings. The plantation holdings included 68,286 acres of mature trees and 36,846 acres of immature trees, or nearly twice as many mature trees as immature trees.

On the other hand, the smallholdings included 49,500 mature trees, or only about 57% of the total, compared with 37,300 immature trees.

The Department of Commerce further noted that exports of natural rubber from Liberia last year were off very slightly, 42,375 long tons, against 42,433 long tons in 1959. Dollar value was up from $33,111,121 in 1959 to $35,968,686 long tons in 1960, owing to high world prices of natural rubber in the first half of last year.

The Liberian Government has a tax of 1¢ a pound on sales and exports of natural rubber when the price is 20 to 30¢, 1.5¢ a pound when the price is 30 to 40¢, 2¢ a pound when the price exceeds 40¢.

Polypropylene Plant Launched in Austria

On July 14, Danube Petrochemie A.G. launched the first Austrian polypropylene plant at Schwechat, near Vienna. Austria is the fifth country in the world to begin production of this plastic following Italy, Germany, the United States and England. The new installation, begun in August, 1959, covers 130 acres and will produce 10,000,000 pounds per year of the plastic under the trade name, Daplen. An adjacent refinery will supply raw material for the process.

Mexico Seeks To Grow Own Rubber Supply

Mexico has started a program to increase production of natural rubber to reduce the imports which her expanding rubber manufacturing industry increasingly requires and which now annually drains some 180 million pesos in foreign exchange.

For the last 18 years the National Institute of Agricultural Research of the Department of Agriculture has been studying the scientific cultivation of rubber and claims to have solved the various problems involved. The Institute has an experimental plantation at El Palomar, Veracruz, where 22,000 trees are already under cultivation. According to the report discussed in *Hule Mexicano y Plasticos* (May, 1961, p. 16) some of the trees are capable of yielding at the rate of about 1,600 to 1,800 pounds per acre per annum. Recently the Malayan Government donated budwood from selected, high-yielding *Hevea* clones, and these are to be planted immediately at the station by experts.

The station has an educational function also; it offers many farmers and country people the opportunity of learning about the great possibilities of the proper methods of growing rubber.

PELLETIZED NEWS

An important new center of the Soviet chemical industry is reported to be planned for the region bordering the middle course of the Volga River, Russia's and also Europe's largest river. A synthetic rubber factory and a section of the Novokuibyschev works for synthetic alcohol are soon to go into operation. Equipment for these projects is to be supplied partly by East Germany and partly by Czechoslovakia. The program calls for the erection of about 50 chemical factories in the Kuibyschev area by 1965, according to reports.

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international picture

Malayan rubber production in the first five months of 1961 was reported at 281,167 tons, up from the 278,194 tons harvested in the like period last year.

NIGERIA has become an important factor in African rubber production. Shipments have progressively risen from 13,410 tons in 1950 to 41,062 tons in 1958 to 53,205 tons in 1959 and to 58,523 tons in 1960.

CHINA took more than half Burma's total exports of rubber in 1960, that is, 5,287 out of 8,707 tons. In 1958 her share was 2,600 out of 11,197 tons, but following what seems to have become a policy of erratic marketing, China bought only 339 tons in 1959, when Burma's total shipments were 11,405 tons.

The amount of SP rubbers exported by Malaya in 1960 rose to 2,828 tons, from 2,316 tons in 1959. The SP RSS rubber continues to be the SP grade most in demand, but the new concentrated PA 80 type, launched last year, is to some extent taking its place. The PA 80 grade, of which 210 tons were sold in 1960, is also affecting sales of SP crepe. SP rubbers were shipped to 23 consumer countries last year, when all but four countries—Germany, Great Britain, New Zealand, and Italy—increased their imports.

DUNLOP TIRE & RUBBER CO., England, will build a £2-million tire and tube plant at Ikeja, near Lagos, Nigeria, with Nigerian interests invited to buy 49% of the stock. The factory is planned to open by the end of next year.

The presence of malonic acid is an inhibiting factor in the formation of rubber in the *Hevea* tree, investigations at the Institut Français du Caoutchouc and the Vietnam Rubber Research Institute (*Rev. gén. caoutchouc*, Mar., 1961, p. 403) indicate. The work was undertaken to discover the cause of the great difference in rubber-producing capacity of certain types of *Hevea*, by studying the variations in the formation of *cis*-polyisoprene in the tree. Earlier studies had shown that when sodium 2 C^{14} acetate is incubated in fresh *Hevea* latex, radioactive rubber is produced. It was thought that by analyzing the serum and evaluating the radioactivity of the rubber, it would be possible to determine the utilization of the precursor. It could thus be shown that incubation of sodium 2 C^{14} acetate yields radioactive organic and amino acids, besides the labeled rubber. Furthermore, variations in the amount of substrate converted into *cis*-polyisoprene could be related to one of the labeled organic acids, which proved to be malonic acid.

***The preparation and properties of* bitumen/rubber masterbatches with which to rubberize bitumen for use in road surfacing** were described by Shin-Ichi Narusawa and others at the Rubber Research Conference held in Kuala Lumpur in September, 1960. These masterbatches, easily dispersible in hot bitumen, are made with low-grade rubber, for instance, flat bark. The formula recommended calls for 80 parts by weight of flat bark, 20 parts distilled 40/60 bitumen, 5 parts oxalic acid powder. All ingredients are mixed in a roll mill. If a high degree of ductility is required, 5 parts by weight of sulfur must also be incorporated.

MALAYA exported 461,812 tons of rubber *in the first five months of 1961.* The United Kingdom, as usual, was the best customer, taking more than 81,000 tons; the United States, with 49,000 tons, was second, very closely followed by Japan with 48,000 tons; Russia was fourth with 45,600 tons; but we note that China, after buying 2,434 tons in January, took nothing in the succeeding four months.

French consumption of synthetic rubber is expected to reach 150,000 tons by 1965, and total rubber consumption to reach 260,000 tons, Alphonse Rougier, head of the chemical division of the French Ministry of Industry, recently announced. This figure compares with 82,000 tons of synthetic rubber consumed last year out of a total of 204,000 tons of rubber consumed, he said. According to estimates, use of synthetic rubber will increase from 40 to 58% of total rubber used, he pointed out.

THAILAND'S rubber output, until a few years ago, went largely to the United States, but the situation has changed. In the first four months of 1961, Thailand exported 60,647 tons of rubber, of which the United States took 14,830 tons, still ranking as top customer, but with a very slender margin over Japan, which came second with 14,541 tons. Substantial amounts were shipped to Malaya and Singapore as well as to the United Kingdom and West Germany. The Iron Curtain countries—Russia, Poland, and Czechoslovakia—took smaller quantities, for a total for the three of 2,854 tons.

The dam at Esch-sur-Sure, in Luxembourg, built at a point where the river Sûre is 100 meters wide, has been given a two-tone protective coating of synthetic rubbers. A coat of black neoprene, one millimeter thick, has been spread over the submerged part of the dam, and one of pale grey "Hypalon," 0.4-millimeter thick, covers the part that is alternately under the water and exposed to the air.

(Continued on page 127)

SILICONE NEWS from Dow Corning

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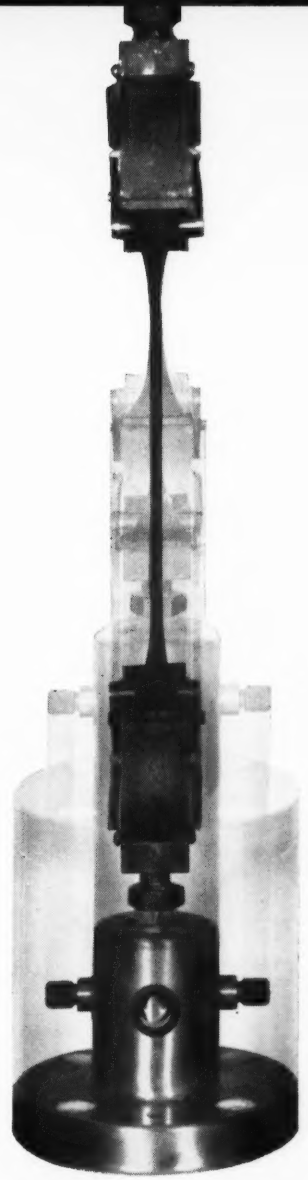

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market reviews

Competition Brings Cuts in Prices Of Stereos, Neoprene—Is SBR Next?

Synthetic Rubber

The effects of increased competition in the rubber industry showed up during the June 16-July 15 period in price cuts of polyisoprene, polybutadiene, and two grades of neoprene. At the same time Polymer Corp., Ltd., Sarnia, Ont., Canada, announced a one-cent cut in its Canadian SBR prices, foreshadowing possible similar cuts by U. S. producers.

Firestone Tire & Rubber Co., Akron, O., led off the cuts by putting the price of Diene, its polybutadiene now in commercial production, at 30¢ a pound. Phillips Chemical Co., Akron, met the price by dropping its Cis-4 polybutadiene from 31.5¢ to 30¢. Shell Chemical Co., Torrance, Calif., which reportedly is not finding sales of its polyisoprene quite so enthusiastic as it had hoped, reduced the price of the product from 27¢ to 26.1¢, and the oil-extended Type 500 from 23.5¢ to 22.6¢.

In mid-July, E. I. du Pont de Nemours & Co., Inc., lowered the price of Neoprene WHV, a general-purpose grade, from 39¢ a pound to 37¢, and the price of Neoprene Latex 842-A from 37¢ to 35¢. Although the announcement said simply that price reductions were made possible by improved manufacturing techniques, there is some possibility that the cut was made to meet competition from nitrile-PVC blends and from Du Pont's own "Hypalon," as well as from straight PVC in the case of such items as conveyor belts.

The cut by Polymer Corp., from 23.25¢ to 22.25¢ for Type 1500 SBR, and of ¾¢ for oil-extended types, will not have any direct effect on U. S. prices. However, U. S. producers may initiate their own cuts, since the prices of the stereo rubbers are getting down uncomfortably near those of some SBR grades. If the price of polyisoprene comes down any farther when the Goodyear plant comes on stream this fall, SBR is almost certain to go down a couple of cents.

Although SBR prices have been stable for a long while, in effect the increased use of black masterbatches has meant a cut in price for some consumers. Since the masterbatches are being sold at close to the price of the polymer plus the black it contains, buyers are saved much of the cost of mixing.

Another price cut, in nitrile rubbers, may be the eventual result of a 40% slash in the price of acrylonitrile, effective July 1. The cut, from 23¢ to 14½¢ a pound, was announced by American Cyanamid Co., New York, N. Y., and matched by other leading producers. The announcement indicated that the reduction in price of the monomer would have no effect on the price of NBR rubbers. This will depend, however, on future decisions on new markets. The price of the polymer now runs from 49 to 66¢ a pound, which means that even a cut of 3¢ or 4¢ in price would hardly make it competitive with lower priced rubbers.

The future holds prospects of hotter competition, not only with natural rubber, but between synthetic rubbers.

Consumption of new rubber in the United States in May totaled 126,335 long tons, compared with 116,020 long tons consumed during April, according to the monthly report of The Rubber Manufacturers Association, Inc. Consumption of synthetic rubber hit 91,000 tons, against 82,813 tons in April, and the percentage of synthetic rubber in total rubber use reached 72.03%. This compared with 71.38% in April and the previous high of 71.63% in December of last year.

Consumption of natural rubber for May was 33,335 long tons, compared with 33,207 long tons in April.

Consumption of synthetic rubber (in long tons) by type in May was: SBR, 74,675, against 68,287 in April; CR, 6,360, against 6,101 in April; IIR, 5,220, against 4,653; NBR, 3,125, against 2,743; and stereo and other elastomers, 1,620, against 1,029.

Synthetic rubber production totaled 109,470 long tons in May, compared with 108,453 long tons in April. Exports were 24,740 long tons, compared with 23,241 long tons in April. Imports were up to 1,265 long tons, contrasted with 835 long tons in April.

Natural Rubber

Prices of natural rubber sagged slightly during the June 16-July 15 period, mainly because the specter of the U. S. government stockpile still hangs over the market. Although no move has been made to remove the 30¢ cutoff on sales of surplus rubber, the present administration is taking another look at the stockpile situation, and the uncertainty has tended to depress the market.

The season of heavy natural rubber production is approaching. At the same time, with auto manufacturers getting ready to retool for the 1962 models, August automobile production is expected to be at the lowest point in a number of years. Both factors should have a further depressing effect on the market. Price cuts in stereo rubbers may also have some effect, although production is still not sufficiently great to exert a real pressure on prices.

There is little question, however, that long-term increase in synthetic rubber facilities in both the U. S. and Europe will have a depressing effect on natural rubber prices over the next few years. Estimates indicate that although the total amount of natural rubber consumed will continue to rise, its percentage of the total market will decline. Although most European producers still use more natural than synthetic, many will be using more synthetic than natural rubber by 1965. The advent of the special processing natural rubbers has not affected this trend, partly because the price differential over regular rubbers is still too high.

Canada, for example, consumed 2,493 tons of natural rubber in April, 33.59% of total new rubber use, compared with 2,739 tons, or 38.54% of total new rubber, in April a year ago. West Germany used 35,631 tons of natural rubber in the first three months of the year, 54.92% of total new rubber use, contrasted with 39,867 tons, 61.98% of the total, in the same period a year ago. France cut its consumption in the first quarter to 58.41% of the total, compared with 60.68% in the first same period a year ago, and is expected to drop consumption to about 40% by 1965.

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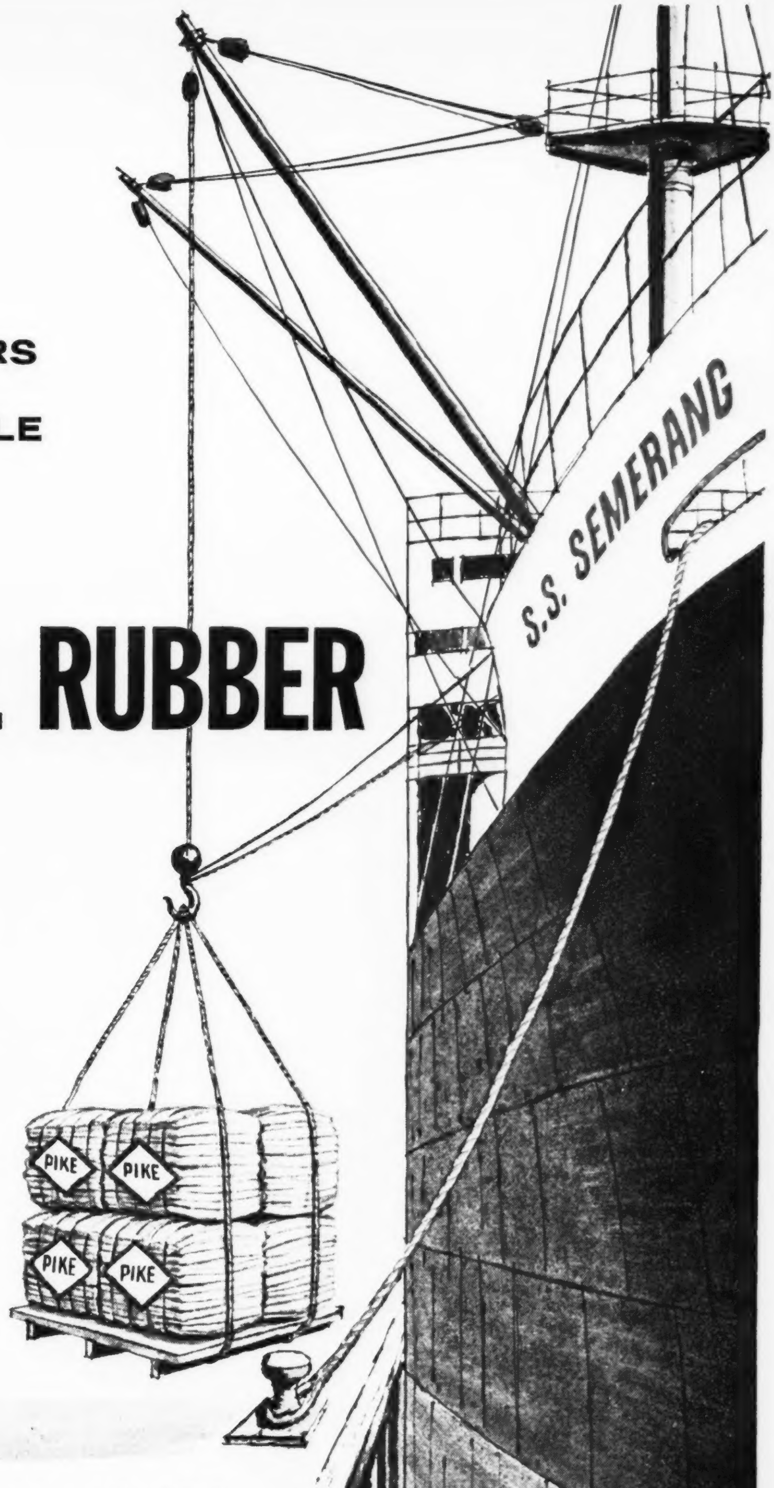

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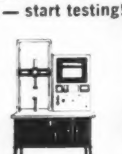

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market reviews

Price of near rubber at the end of the June 16-July 15 period dropped to 29.30¢, against 29.75¢ at the end of the May 16-June 15 period. Sales under the Rex Contract on the New York Commodity Exchange were 7,130 lots in June, compared with 10,670 in May, and 590 under the Standard Contract, compared with 670 in May.

The average price for RSS #1 in June was 29.93¢, compared with 32.03¢ in May, and the June 16-July 15 average was 29.58¢ compared with 30.98¢ in the May 16-June 15 period. There were 22 trading days in the month and 20 in the June 16-July 15 period. Average June sellers' prices for other grades were: RSS #3, 29.43¢; Amber Blankets, 26.02¢; and Flat Bark, 29.58¢.

(Prices of Natural Rubber—Rex and Standard contracts and on the Outside Market—appear on page 134).

Latex

There was little change in the drum latex market during the June 16-July 15 period. A limited offtake is reported for the nearer shipment positions; while the forward positions continue to arouse little interest. The bulk latex market also showed no real change, although a little activity has tended to harden asking price of sellers.

Shipments from Malaya during May amounted to 8,550 tons, of which 2,467 tons were shipped to the United Kingdom, 1,319 to Japan, 785 to West Germany and 623 to the United States. These figures compare with total shipments of 7,218 tons in April, of which 2,234 went to the United Kingdom, 787 to Japan, 783 to West Germany, and 545 to the U. S.

Prices for ASTM centrifuged natural latex, in tank-car quantities f.o.b. tank car, were 35.12¢ per pound solids on July 15, against 35.07¢ per pound solids on June 15. Prices of synthetic latices remained at 26 to 40.24¢ for SBR, 37¢ to 57¢ for CR, and 45 to 60¢ for NBR.

(All figures in long tons, dry weight)

Type of Latex	Production	Imports	Consumption	Month-End Stocks
Natural				
Apr.	0	3,029	3,413	9,404
May	0	*	3,473	8,518
SBR				
Apr.	7,703	——	6,529	8,643
May	8,614	——	6,971	9,162
Neoprene				
Apr.	1,167	——	864	2,058
May	729	——	911	1,573
Nitrile				
Apr.	1,008	——	1,130	2,271
May	1,095	——	1,113	2,376

* Not available yet for period covered.

Tire Cord

The major development in tire cord prices is the switch to heavier yarns brought about by development of two-ply tires. As noted in Industry News, most of the compacts currently being produced are using two-ply rayon tires as original equipment, and several of the 1962-model standard cars will probably be equipped with two-plies.

What this development means is a switch from 1100 and 1650 denier yarns to 2200 and 3300 denier yarns, with some 1650 denier yarns still being used. The saving is shown by the prices of the different deniers. Current prices of 1100 denier rayon yarn is 57¢ a pound, of 1650 denier, 50¢, and of 2200 denier, 48¢. Total poundages of yarn used are expected to be about the same as with the four-ply.

The switch to two-ply nylon replacement tires will not mean any difference in price, since both the 840 denier yarns normally used in four-ply tires and the 1680 yarns used in two-ply tires are priced at 92¢. The poundage of nylon in a two-ply tire, however, will generally be less than in a four-ply.

Meanwhile, both nylon and rayon manufacturers are continuing to claim gains in the continuing war for domination of the tire market. Chemstrand Corp., New York, N. Y., announced that the first quarter of 1961 saw a 12% increase in the amount of nylon cord fabric used in tires over consumption in the last quarter of 1960, contrasted with a 10.4% decrease in the amount of Tyrex rayon cord fabric used. Chemstrand also reported that 36.62% of original-equipment truck tires shipped during the first quarter of the year were nylon, compared with 30.56% of those shipped in 1960.

In replacement truck tires, 60.91% of the tires shipped in the first quarter were nylon, against 55.60% in 1960. In replacement passenger tires, 51.87% shipped in the first quarter were nylon, compared with 49.86% in 1960.

Chemstrand further revealed that 60% of all replacement truck and bus tires and 36% of all original-equipment truck and bus tires shipped in the first quarter were nylon, both new highs in percentage of nylon use.

Rayon producers, however, point out that nylon hasn't had things all its own way recently. Production of nylon yarn reached a high of 41.2 million pounds in the second quarter of 1960, then dropped to 32.9 million pounds in the third quarter, and 28.9 million pounds in the fourth quarter. Meanwhile rayon production rose from 51.8 million pounds in the third quarter to 54.4 million in the fourth quarter.

According to *Textile Organon*, first-quarter tire cord production this year was 65% rayon and 35% nylon, compared with 63% rayon and 37% nylon in 1960. Production of both fibers increased. First-quarter '61 rayon tire cord production was 56,287,000 pounds, up 3% from the 54,388,000 pounds in the fourth quarter of '60; and nylon production, 30,512,000 pounds, up 6% from the 28,897,000 in the fourth quarter last year.

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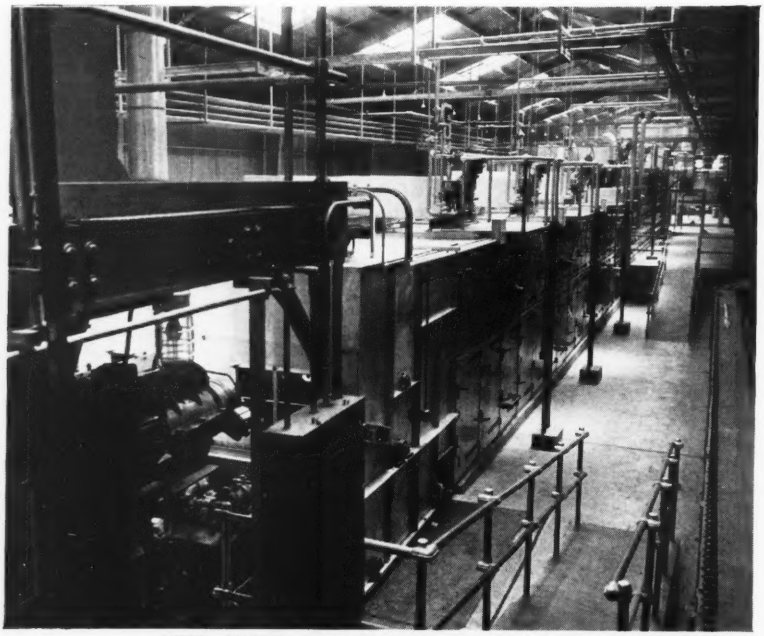

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market reviews

With nylon capacity due to go up from 424 million pounds to an estimated 567.5 million pounds by the beginning of next year, the pressure will be on to capture a larger share of the tire cord market, especially since the shift to two-ply tires should mean a smaller total poundage of nylon yarn used for a given number of tires. If past history is any indication, the situation may bring on a new round of price cuts. Prices have already come down from $1.20 a pound in 1959 to 92¢ at the present time.

According to *Textile Organon*, packaged production of high-tenacity rayon yarn in June was 18.5 million pounds, compared with 19 million pounds in May. Domestic shipments were 17.2 million pounds, against 17.3 million pounds in May; and total shipments, 18.6 million pounds, compared with 18.5 million in May. Stocks were 19.2 million pounds at the end of June, against 19.3 million pounds on May 31.

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1650/1500/2	.60
Tire Yarns	
High-Tenacity	
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1100/980	.57
1150/490,980	.56
1650/1100	.51
2200/1440	.48
3300/2200	.48

NYLON PRICES

Tire Yarns	
840/140	.92
1680/280	.92

Reclaimed Rubber

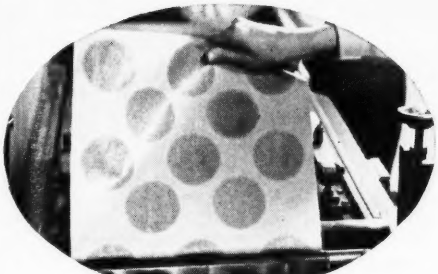
The reclaimed rubber market began to slack off during the June 16-July 15 period as factories started their summer vacation shutdowns and as automobile production slowed down in preparation for the change to 1962-model cars.

There were, however, definite indications that business would pick up substantially when fall production starts.

An eastern reclaimer predicted that August business would be 20% over that of July, although business will slack off again in September while the model changeover is taking place. Another eastern reclaimer noted a definite flurry of sales before the summer slack started.

A Midwest reclaimer, while noting the summer slowdown in business, expressed hope that it would pick up in the fall.

Production of reclaimed rubber reached 23,665 long tons in May, compared with 21,321 long tons in April, according to the monthly report of The Rubber Manufacturers Association, Inc. The five-month figure was 109,062 long tons, contrasted with 134,451 long tons



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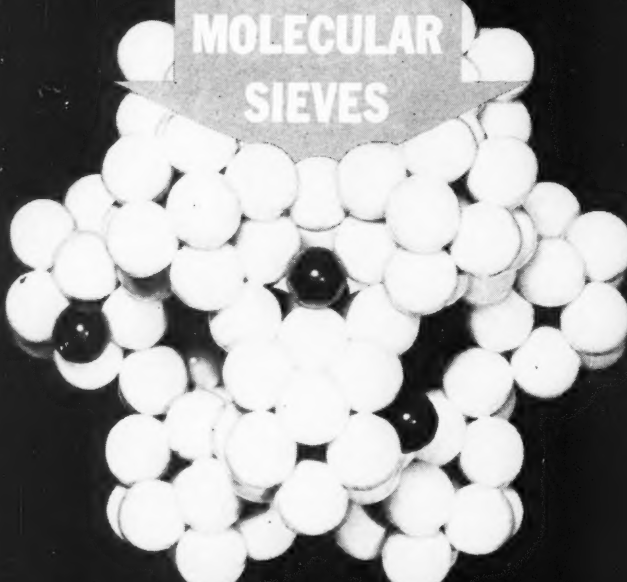

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For details, write Dept. RW-08 Linde Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, New York. **In Canada:** Union Carbide Canada Limited, Linde Gases Division, Toronto 12.

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UNION CARBIDE

market reviews

during the same period last year. Consumption rose to 22,175 long tons for May from 20,736 long tons in April, and the five-month figure was 104,071 long tons, contrasted with 126,038 long tons during the first five months of 1960. Exports were 1,200 long tons in May, against 1,349 long tons in April; while 103,233 long tons were exported in the first five months of 1961, compared with 128,366 long tons during the corresponding period of 1960.

RECLAIMED RUBBER PRICES

Whole tire, first line	$0.115
Third line	.1075
Inner tube, black	.17
Red	.22
Butyl	.16
Light carcass	.22
Mechanical, light-colored, medium gravity	.185
Black, medium gravity	.10

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims, in each general group separately featuring characteristic properties of quality, workability, and specific gravity, at special prices.

Scrap Rubber

The scrap rubber market was fairly active in the June 16-July 15 period. Prices remain unchanged.

	Eastern Points	Akron, O.
	Per Net Ton	
Mixed auto tires	$7.00/$11.00	$11.00
S.A.G. truck tires	nom.	nom.
Peeling, No. 1	nom.	nom.
2	nom.	nom.
3	nom.	nom.
	(¢ per Lb.)	
Auto tubes, mixed	4.75	4.75
Black	6.00	6.00
Red	nom.	nom.
Butyl	6.25	6.25

•

News about People

(*Continued from page 102*)

Charles W. Walton has been named vice president for research, Minnesota Mining & Mfg. Co., St. Paul, Minn., succeeding **Carl Barnes,** who recently resigned.

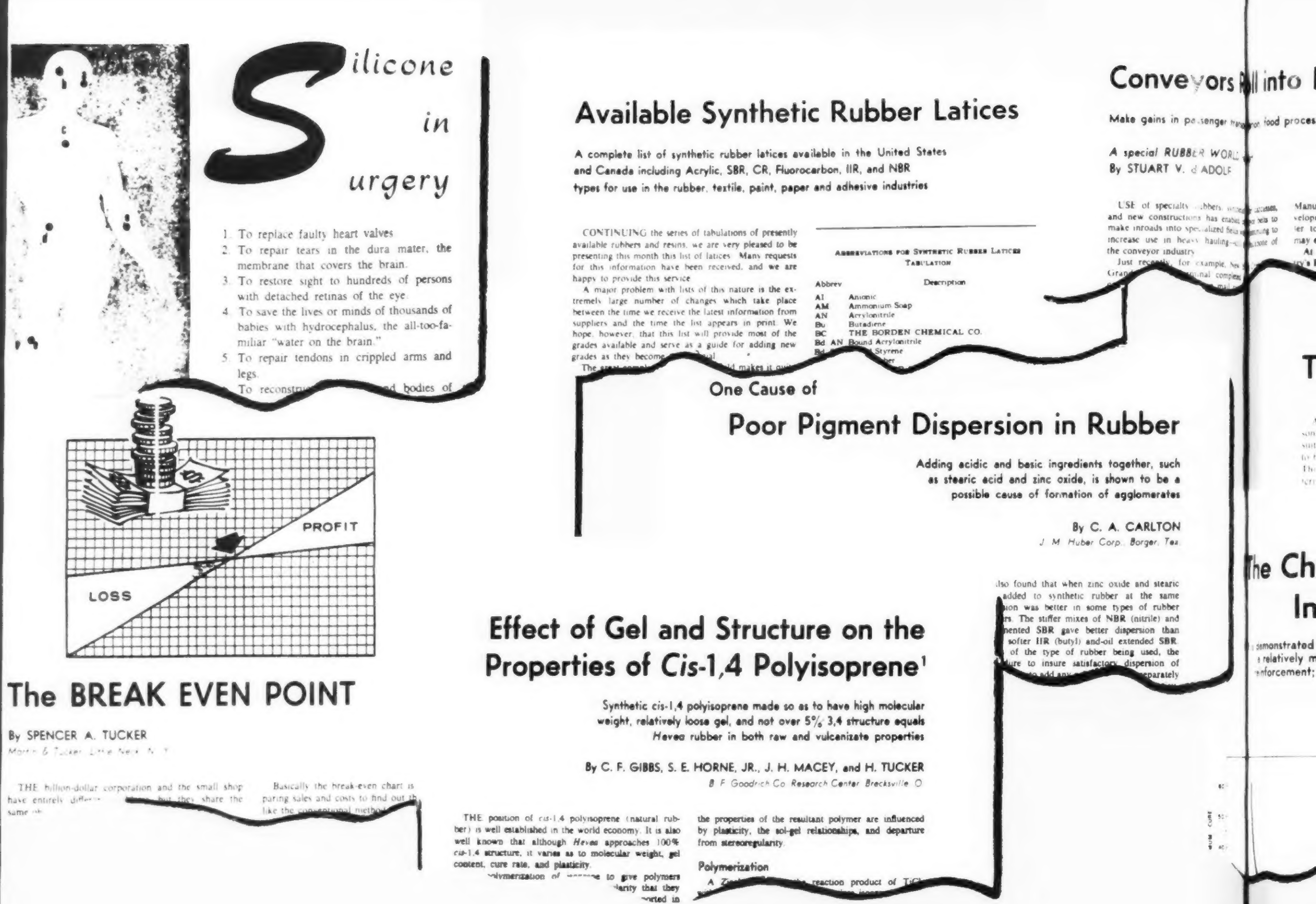
Edward W. Upton has been named manager of the Rubbercap division of Plastics Applicators, Inc., Houston, Tex. He will direct all sales and manufacturing operations for the division.

Thomas F. Owens has been named treasurer of National Lead Co., New York, N. Y., succeeding **Joseph J. Morsman, Jr.,** who retired on June 30. Owens has been assistant comptroller of the company since 1951.

(*Continued on page 127*)

RUBBER WORLD

CAN THESE ARTICLES BE FROM THE SA



Yes! From RUBBER WORLD with its new, modern publishing concept!

Today's rubber chemist is breaking out of his mold

The rubber chemist can no longer be confined strictly to technical compounding. The rubber business is moving too fast. He's a trouble-shooter and advisor to production departments. He's now involved in management decisions on efficiency, materials handling, personnel training, new fields for company expansion—all *in addition* to keeping up with rapid advances in new materials and techniques. He's no longer a chemist, he's a *chemist/executive.*

So technical information is no longer enough for today's chemist/executive. He must know everything that's going on that may affect his industry.

Today's RUBBER WORLD meets and anticipates the rubber chemist/executive's information needs

It has a new publishing concept: to explore and report the *full range* of the rubber chemist/executive's information needs...to inquire into management techniques, into other industries that offer solutions to rubber industry problems.

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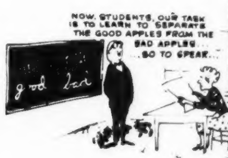

Training Inspectors for Quality Control

The Chemistry of Carbon Black In Rubber Reinforcement[1]

demonstrated that combined oxygen on the surface of carbon black plays a relatively minor role in the chemical effect of carbon black upon rubber reinforcement; the nature of the carbon surface itself plays the major role

By C. W. SWEITZER, K. A. BURGESS, and F. LYON

Columbian Carbon Co. Research Laboratories, Princeton, N. J.

At the same time, RUBBER WORLD continues to report fully the technical developments in the rubber industry. But with a difference!

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Today's RUBBER WORLD is a fast-reading, interestingly-written magazine. It has been restyled with a fresh, modern, clean-cut look designed to save the reader time while it exposes him to its full range of articles and features.

RUBBER WORLD's experienced staff is a balanced team of skilled journalists and skilled technologists—editors who know how to recognize topics of vital interest to the industry...who know how to go out after a story, dig out all of its implications, and turn out a thought-provoking, helpful article.

Sparks great interest, heavier reader-traffic

Today's RUBBER WORLD goes far beyond the "technical society" magazines—which serve mainly as repositories for technical papers. RUBBER WORLD covers this specialized area, too, but it also has the added interest and traffic generated by the skillful handling of technical news and broad industrial subjects.

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News about People

(*Continued from page 122*)

A. T. Gurmatakis has been made regional manager of rubber chemicals and plastics sales for the Latin American region of Phillips Petroleum International Corp., wholly owned subsidiary of Phillips Petroleum Co., Bartlesville, Okla., with headquarters in Montevideo, Uruguay.

Melvin P. Hershey has been appointed manager of tire engineering, **A. F. Weber,** manager of highway truck engineering, and **R. C. Shipman,** manager of off-the-road tire engineering, of The Firestone Tire & Rubber Co., Akron, O.

Paul J. Mester has been appointed superintendent of reclaim and dispersion production for the Naugatuck Chemical Division, United States Rubber Co., Naugatuck, Conn. He succeeds **George M. Emery,** who retired from the post on June 30, after 40 years of service to the rubber industry.

Peter T. Cherpas has been named branch manager of the Santa Ana, Calif., tread rubber facility of W. J. Voit Rubber Corp., Los Angeles, Calif. He will also be responsible for sales in California, Nevada, Arizona, Wyoming, Colorado, Utah, New Mexico, and west Texas.

International Picture

(*Continued from page 110*)

THE TURKISH COMMITTEE for the Promotion of Foreign Investments has approved construction of tire plants in Turkey by Goodyear Tire & Rubber Co., Akron, O., and United States Rubber Co., New York, N.Y. Turkish capital invested in the two projects will amount to about 40%. Goodyear will invest some 54 million Turkish pounds in a plant to produce 400,000 tires a year, and U. S. Rubber, 60 million Turkish pounds in a 300,000-tire-a-year plant. Production is expected to start in about two years.

A method for making synthetic rubber directly from natural gas has reportedly been developed by a group of Soviet scientists and is being applied on an industrial scale in Sumagit, Azerbaidjan.

THE JAPAN SYNTHETIC RUBBER CO. has signed a contract with the Soviet Union to export about 2,000 tons of synthetic rubber in August and September at a price reported at less than $900,000, or about 20¢ a pound. The company expects Russia to buy a considerable amount of synthetic rubber on a long-term basis. This is the first export deal in synthetic rubber between Japan and the Soviet.

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statistics of the rubber industry

U. S. Consumption of Natural And Synthetic Rubber*

(Long Tons)

Year	Natural	SBR	IIR	CR	NBR	Total
1960						
Aug.	37,528	73,761	4,880	7,200	2,737	125,836
Sept.	36,770	72,593	4,901	7,906	2,740	124,100
Oct.	37,033	74,606	4,552	6,920	2,706	125,817
Nov.	35,965	72,702	4,455	6,372	2,650	122,144
Dec.	31,891	67,549	4,229	5,983	2,315	111,967
1961						
Jan.	35,512	71,653	5,143	6,345	2,591	121,244
Feb.	31,871	64,710	4,544	5,802	2,121	109,624
Mar.	34,908	71,110	5,005	6,592	2,559	120,916
Apr.	33,207	68,287	4,653	6,101	2,743	116,020
May	35,284	74,188	5,142	6,563	3,067	125,848

* Including latex.
Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

U. S. Imports and Production of Natural And Synthetic Latices

(Long Tons, Dry Weight)

Year	Natural	SBR	CR	NBR	Total Synthetic	Natural and Synthetic
1960						
Aug.	4,174	8,096	978	1,291	10,365	14,539
Sept.	2,541	9,397	1,119	1,299	11,815	14,356
Oct.	2,042	9,063	1,272	1,176	11,511	13,553
Nov.	3,456	7,205	1,169	1,328	9,702	13,158
Dec.	3,572	6,934	660	996	8,590	12,162
1961						
Jan.	4,761	7,821	853	1,174	9,848	14,609
Feb.	4,719	6,286	727	966	8,069	12,788
Mar.	3,855	8,500	936	763	10,468	14,323
Apr.	3,029	7,703	1,167	1,008	9,878	11,907
May	....	8,614	729	1,095	10,458	....

Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

U. S. Imports and Production of Natural and Synthetic Rubber*

(In Long Tons)

Year	Natural	SBR	IIR	CR	NBR	Natural and Synthetic
1960						
Aug.	39,596	98,541	9,804	10,120	3,170	161,231
Sept.	31,862	90,392	9,183	10,078	3,190	144,715
Oct.	26,908	87,857	8,711	11,219	3,204	137,899
Nov.	30,411	87,540	8,365	11,261	3,299	140,876
Dec.	39,084	86,242	3,951	11,291	3,175	153,743
1961						
Jan.	33,750	84,619	6,066	11,896	3,230	139,561
Feb.	26,766	79,892	7,875	10,344	3,134	128,011
Mar.	28,737	89,779	9,486	10,073	3,242	141,317
Apr.	24,583	87,742	8,400	8,776	3,535	133,036
May	....	89,662	7,391	8,871	3,578	....

* Including latex.
Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

U. S. Consumption of Natural and Synthetic Latices

(Long Tons, Dry Weight)

Year	Natural	SBR	CR	NBR	Total Synthetic	Natural and Synthetic
1960						
Aug.	3,897	7,857	1,057	1,078	9,992	13,889
Sept.	4,250	7,458	942	1,122	9,522	13,772
Oct.	4,283	7,371	971	1,118	9,460	13,743
Nov.	4,338	7,171	914	1,104	9,189	13,527
Dec.	3,588	6,756	750	898	8,404	11,992
1961						
Jan.	3,525	6,667	779	1,005	8,451	11,976
Feb.	3,295	6,303	727	713	7,743	11,038
Mar.	3,575	6,866	936	904	8,706	12,281
Apr.	3,413	6,529	864	1,130	8,523	11,936
May	3,473	6,971	911	1,113	8,995	12,468

Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

U. S. Exports of Synthetic Rubber*

(Long Tons)

Year	SBR	IIR	CR	NBR	Total
1960					
Aug.	22,753	3,494	3,519	501	30,267
Sept.	16,836	3,500	3,340	389	24,065
Oct.	15,439	2,922	3,913	629	22,903
Nov.	17,792	1,928	2,760	546	23,026
Dec.	17,415	2,282	2,775	759	23,231
1961					
Jan.	18,180	2,273	5,047	545	26,045
Feb.	18,949	2,425	4,010	785	26,384
Mar.	19,415	7,733	4,471	649	27,693
Apr.	18,795	1,075	2,548	708	23,496

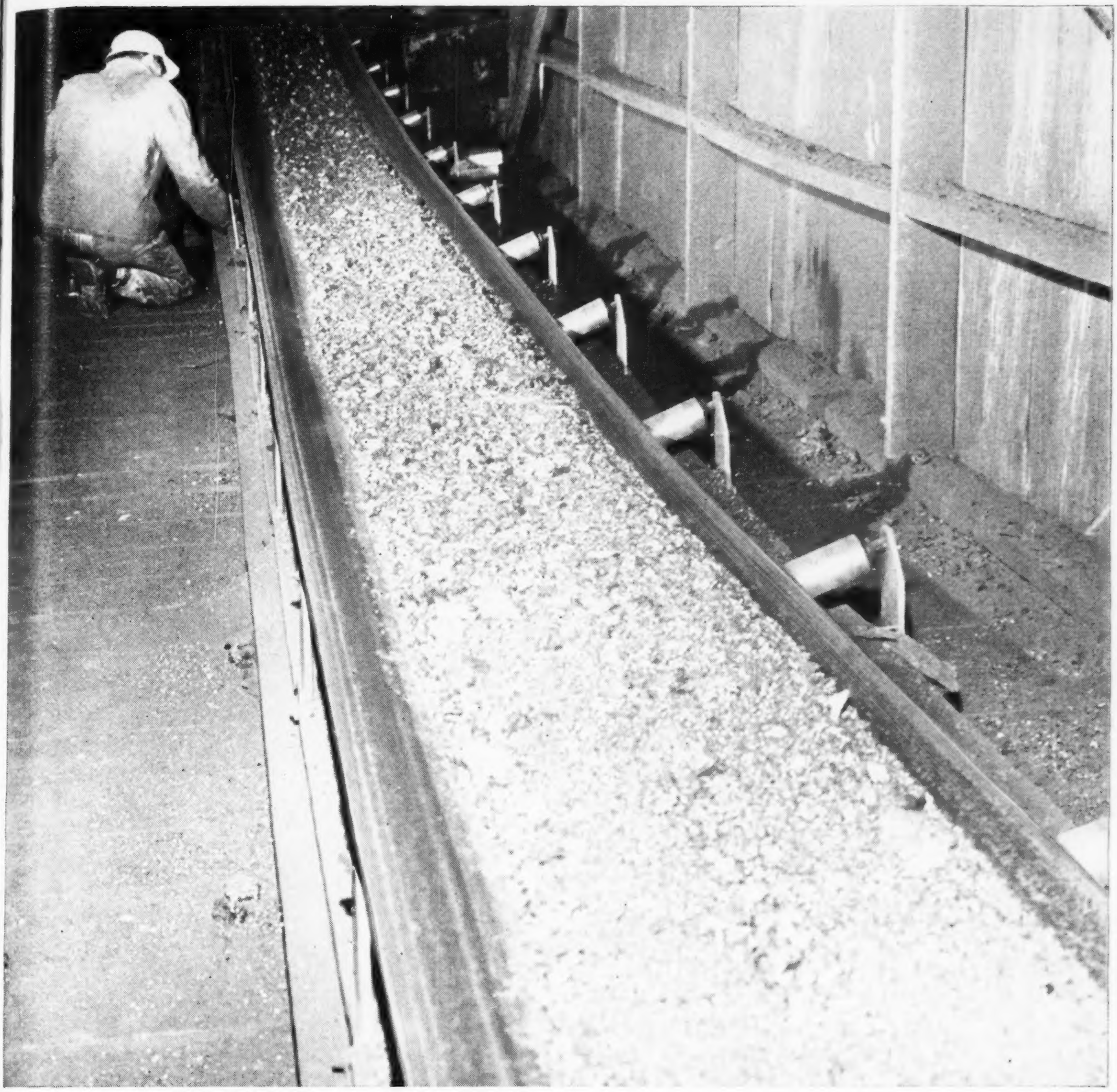
* Including latices.
Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

U. S. Reclaimed Rubber*

(Long Tons)

Year	Production	Consumption	Exports	Stocks
1960				
June	25,429	24,677	1,164	31,699
July	21,472	19,249	1,384	33,624
Aug.	23,540	21,452	951	33,979
Sept.	22,251	22,101	1,028	33,949
Oct.	23,546	23,269	804	33,519
Nov.	22,013	21,014	1,167	33,783
Dec.	20,010	19,921	859	33,048
1961				
Jan.	22,528	22,052	1,084	33,101
Feb.	19,724	18,550	1,208	33,493
Mar.	21,824	20,558	1,090	32,695
Apr.	21,321	20,736	1,349	31,593
May	23,317	21,989	....	31,663

* Natural and synthetic.
Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.



BELT ACTION —The Milburn Colliery Company of Milburn, West Virginia produces a high grade bituminous coal that public utilities utilize for power purposes. In the Milburn #4 Mine approximately five thousand feet of conveyor belts are used to transport the coal underground and to the surface. These belts must of necessity be rugged, meet fireproof specifications, have great impact resistance, high resistance to abrasion and edge wear. They must also have a maximum fastener holding ability. This new P.V.C. impregnated and coated multiweave belt is an important new addition to the Milburn surfacing conveyors. This multiweave construction with either P.V.C. or Neoprene covers is gaining widespread acceptance and is becoming highly popular, particularly in coal mining operations. Belts were supplied to the Milburn Colliery Company by Hewitt-Robins, Inc. They were made with Mount Vernon's new multiweave belt carcasses.

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World Production of Natural Rubber

(1,000 Long Tons)

Year	Malaya Estate	Malaya Native	Indonesia Estate	Indonesia Native	All Other	Total
1960						
Aug.	36.1	26.0	16.9	17.3	59.2	152.5
Sept.	36.6	25.1	16.2	36.9	56.7	172.5
Oct.	37.1	26.0	18.1	36.0	55.3	172.5
Nov.	35.3	21.6	18.7	17.0	57.4	150.0
Dec.	39.2	27.7	20.0	51.2	66.9	205.0
1961						
Jan.	40.5	26.9	19.1	15.8	53.2	157.5
Feb.	30.8	26.0	18.0	27.6	45.1	147.5
Mar.	29.9	21.6	15.0	...	...	...
Apr.	27.8	21.0	...	...	...	...

Source: Secretariat of the International Rubber Study Group.

World Consumption of Natural Rubber*

(1,000 Long Tons)

Year	U. S.	Eastern Europe and China†	U. K.	France	Germany	World Total†
1960						
Aug.	37.3	31.5	10.2	4.0	11.3	152.5
Sept.	36.8	30.1	16.7	11.5	11.8	165.0
Oct.	37.0	33.3	14.2	11.7	10.9	162.5
Nov.	36.0	33.0	13.8	10.7	11.5	162.5
Dec.	31.9	27.7	13.7	11.3	10.0	150.0
1961						
Jan.	35.1	41.3	12.3	11.2	12.2	167.5
Feb.	31.9	34.7	...	10.4	11.6	157.5
Mar.	34.9	...	...	...	11.9	167.5
Apr.	33.2	...	...	...	...	...

* Figures include latices.
† Estimated or partly estimated.
Source: Secretariat of the International Rubber Study Group.

World Production of Synthetic Rubber*

(1,000 Long Tons)

Year	U. S.	Canada	Germany	U. K.	Italy	Japan	Total
1960							
Aug.	121.6	12.7	7.2	7.9	6.0	2.1	160.0
Sept.	112.9	12.7	6.0	8.2	6.5	0.8	150.0
Oct.	111.0	14.3	7.0	6.3	6.5	1.7	152.5
Nov.	110.5	13.4	7.8	7.9	6.5	2.1	150.0
Dec.	104.7	13.9	6.9	9.9	6.5	2.0	147.5
1961							
Jan.	105.8	13.8	6.8	8.3	6.3	2.7	147.5
Feb.	101.2	12.8	6.7		6.3	3.1	142.5
Mar.	112.6	14.2	6.7		6.3	2.9	155.0
Apr.	108.5		...	...	...	...	....

* Figures include latices. No data available from Iron Curtain countries.
Source: Secretariat of the International Rubber Study Group.

World Consumption of Synthetic Rubber*

(1,000 Long Tons)

Year	U. S.	Canada	U. K.	France	Germany	Japan	Total†
1960							
Aug.	88.6	3.8	7.0	3.2	9.1	5.4	142.5
Sept.	87.3	5.0	11.3	8.6	9.4	5.4	150.0
Oct.	88.8	4.5	9.6	8.7	9.3	..	152.5
Nov.	86.2	5.2	9.2	..	9.6	..	150.0
Dec.	80.0	4.5	9.5	8.7	8.8	5.7	142.5
1961							
Jan.	86.2	4.4	8.8	..	9.8	5.7	152.5
Feb.	77.7	4.4	..	7.8	9.6	5.9	140.0
Mar.	86.0	4.8	..	..	9.8	6.4	152.5
Apr.	82.8	..	..	..	..	..	....

* Including latices.
† Figures estimated. No account has been taken of synthetic rubber originating in Eastern Europe.
Source: Secretariat of the International Rubber Study Group.

U. S. Rubber Industry Employment Wages, Hours

Year	Production Workers (1000's)	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings	Consumer's Price Index
All Rubber Products					
1939	121.0	$27.84	39.9	$0.75	
1960					
Sept.	197.8	98.28	39.0	2.52	126.8
Oct.	197.9	101.49	39.8	2.55	127.3
Nov.	192.6	99.57	39.2	2.54	127.4
Dec.	190.6	99.58	38.9	2.56	127.5
1961					
Jan.	187.5	98.81	38.9	2.54	127.4
Feb.	180.8	97.27	38.6	2.53	127.5
Mar.	180.9	97.15	38.4	2.52	127.5
Apr.	181.4	....	...	...	127.5
Tires and Tubes					
1939	54.2	$33.36	35.0	$0.96	
1960					
Sept.	74.5	112.40	38.1	2.95	
Oct.	73.8	117.00	39.0	3.00	
Nov.	73.1	114.60	38.2	3.00	
Dec.	71.5	118.59	39.4	3.01	
1961					
Jan.	70.4	113.54	37.1	2.98	
Feb.	66.9	110.78	37.3	2.97	
Mar.	66.4	109.37	36.7	2.98	
Rubber Footwear					
1939	14.8	$22.80	37.5	$0.61	
1960					
Sept.	18.5	79.18	39.2	2.02	
Oct.	18.5	82.59	39.9	2.07	
Nov.	17.4	82.16	39.5	2.08	
Dec.	18.4	79.00	37.8	2.09	
1961					
Jan.	18.3	82.32	39.2	2.10	
Feb.	18.9	85.60	40.0	2.14	
Mar.	19.1	82.92	39.3	2.11	
Other Rubber Products					
1939	51.9	$23.34	38.9	$0.61	
1960					
Sept.	104.8	92.10	39.7	2.32	
Oct.	105.6	93.73	40.4	2.32	
Nov.	102.1	92.17	39.9	2.31	
Dec.	100.7	89.40	38.7	2.31	
1961					
Jan.	99.2	91.01	39.4	2.31	
Feb.	95.0	90.16	39.2	2.30	
Mar.	92.4	90.62	39.4	2.30	

Source: BLS, United States Department of Labor.

U. S. Tire Fabric Production

(Thousands of Pounds)

	Tire Cord & Fabrics			Chafer & Other Fabrics		
	Nylon	Rayon	Cotton	Nylon	Cotton	Total
1960						
Apr.-June*	41.2	64.7	.8	2.3	7.9	116.9
July-Sept.	32.9	51.8	.7	1.9	5.8	93.1
Oct.-Dec.	28.9	54.4	.7	1.9	4.8	90.7

* Breakdown between nylon and cotton tire fabric production not available for earlier periods.
Source: Bureau of the Census, United States Department of Commerce.

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Extend the life and the original looks of your products and you build customer good will that reflects itself in greater sales and profits. Nothing will give them more stability, more protection against the inroads of age than Harchem Sebacate Plasticizers. Whether you seek resistance to heat, cold, water, weather or physical abuse, the key to your problem can be found in the chart of four Sebacic Acid Esters found below.

Plasticizer	Specific Gravity 25°/25°C ±.003	Viscosity 25°C, cps	Compatible With	Outstanding Characteristics
Dibenzyl Sebacate	1.055	21-22	Polyvinyl Chloride and Copolymers, Polyvinyl Butyral, Synthetic Rubbers	Excellent Solvation, Very Low Volatility, Permanence, Good Electricals, Low Temp. Flexibility
Dibutyl Sebacate	0.935	7.9	Vinyl Resins, Cellulose Acetobutyrate, Synthetic Rubbers, Rubber Hydrochloride, Polymethyl Methacrylate	Low Temp. Flexibility, Excellent Aging Qualities, Non-Toxic
Dimethyl Sebacate	0.986*	3.54 @30°C	Vinyl Resins, Synthetic Rubbers, Cellulose Nitrate, Cellulose Acetobutyrate, Acrylic Resins	High Solvency and Efficiency, Wide Compatibility, Concentrated Source of Sebacyl Radical
Dioctyl Sebacate	0.913	17.4	Polyvinyl Chloride and Copolymers, Polyvinyl Butyral, Synthetic Rubbers, Cellulose Nitrate, Cellulose Acetobutyrate	Excellent Low Temp. Flexibility, Low Volatility, Excellent Soapy Water Resistance, Good Electricals

*30°/20°C

WRITE FOR BULLETIN OR CONSULT CHEMICAL MATERIALS CATALOG PAGES 159-161

THE KEY TO HARCHEM® BETTER PLASTICS

HARCHEM DIVISION

WALLACE & TIERNAN, INC.
25 MAIN STREET, BELLEVILLE 9, NEW JERSEY
IN CANADA: HARCHEM LIMITED, TORONTO

Carbon Black Statistics—Jan.-May, 1961

Furnace blacks are classified as follows: SRF, semi-reinforcing furnace black; HMF, high modulus furnace black; GPF, general-purpose furnace black; FEF, fast-extruding black; HAF, high abrasion furnace black; SAF, super abrasion furnace black; ISAF, intermediate super abrasion furnace black.

(Thousands of Pounds)

Production	Jan.	Feb.	Mar.	Apr.	May
Furnace types					
Thermal	12,195	11,630	12,724	10,031	12,885
SRF	24,487	20,005	24,173	24,388	27,107
HMF	2,774	4,191	5,116	5,508	3,196
GPF	11,847	12,077	12,782	11,078	11,583
FEF	17,025	19,145	16,824	15,973	17,339
HAF	45,286	33,369	42,988	43,961	51,179
SAF	218	3,057	1,094	758	1,921
ISAF	26,373	23,881	29,363	27,019	25,356
Total furnace	140,205	127,355	145,064	138,716	150,566
Contact types	24,056	21,732	22,427	21,417	21,852
Totals	164,261	149,087	167,491	160,133	172,418
Shipments					
Furnace types					
Thermal	12,294	10,601	12,227	10,574	13,171
SRF	21,902	22,151	24,722	21,845	25,293
HMF	4,381	5,007	5,234	4,063	4,475
GPF	11,882	10,896	12,714	10,064	11,088
FEF	17,829	16,728	17,657	16,414	19,095
HAF	38,837	38,389	40,167	36,050	48,764
SAF	1,498	1,055	1,587	1,189	938
ISAF	25,796	22,670	27,310	20,871	26,024
Total furnace	134,419	127,497	141,668	121,070	148,848
Contact types	22,640	21,906	22,832	20,587	23,903
Totals	157,059	149,403	164,600	141,657	172,751
Producers' Stocks, End of Period					
Furnace types					
Thermal	22,875	23,904	24,429	23,886	23,600
SRF	44,448	42,302	41,703	44,272	46,086
HMF	8,753	7,937	7,819	9,264	7,985
GPF	8,747	9,928	9,996	10,988	11,483
FEF	18,319	20,736	19,156	18,715	16,959
HAF	63,268	57,877	58,436	66,340	68,755
SAF	3,267	5,269	3,891	3,460	4,443
ISAF	35,017	36,228	38,028	44,250	43,582
Total furnace	204,694	204,181	204,454	221,175	222,893
Contact types	73,542	73,368	72,963	73,793	70,890
Totals	278,236	277,549	276,417	294,968	293,783
Exports					
Furnace types					
Total furnace	29,965	27,614	41,213	37,056	
Contact types	10,598	11,989	11,738	10,619	.....
Totals	40,563	39,603	52,951	47,675	.....

Source: Bureau of Mines, United States Department of the Interior, Washington, D. C.

U. S. Automotive Inner Tubes

(Thousands of Units)

	Shipments					
Year	Original Equipment	Replacement	Export	Total	Production	Inventory End of Period
1959	3,624	41,522	890	46,036	46,059	10,536
1960	3,320	36,511	1,120	40,982	40,851	11,034
1961						
Jan.	237	4,783	56	5,076	3,208	9,394
Feb.	231	2,988	58	3,277	3,140	9,246
Mar.	281	3,246	60	3,588	3,359	9,014
Apr.	299	2,533	70	2,902	2,939	9,096
May	306	2,424	65	2,795	3,190	9,487

Source: The Rubber Manufacturers Association, Inc.

U. S. Automotive Pneumatic Casings

(Thousands of Units)

	Shipments					
Year	Original Equipment	Replacement	Export	Total	Production	Inventory End of Period
Passenger Car						
1960	36,321	65,222	895	95,685	105,466	23,583
Sept.	2,676	5,749	59	8,484	8,158	22,037
Oct.	3,342	5,366	53	8,760	8,461	21,816
Nov.	3,171	4,123	55	7,348	7,979	22,493
Dec.	2,844	3,900	55	6,799	7,809	23,583
1961						
Jan.	2,191	5,955	44	8,189	8,234	23,691
Feb.	1,930	4,152	43	6,125	7,643	25,268
Mar.	2,134	5,876	72	8,082	8,195	25,385
Apr.	2,602	6,444	54	9,100	7,866	24,150
May	3,031	6,944	57	10,032	8,501	22,669
Truck and Bus						
1960	3,686	9,249	728	13,875	14,463	3,797
Sept.	273	811	61	1,146	1,026	3,856
Oct.	247	938	68	1,254	1,069	3,683
Nov.	255	649	51	955	1,066	3,797
Dec.	243	552	56	851	995	3,957
1961						
Jan.	258	635	48	941	988	3,991
Feb.	261	569	49	879	948	4,070
Mar.	313	719	52	1,084	1,016	4,000
Apr.	332	758	43	1,133	1,017	3,883
May	346	772	42	1,160	1,103	3,834
Total Automotive						
1960	40,203	77,773	1,751	119,698	111,569	27,540
Sept.	2,950	6,560	120	9,630	9,184	25,893
Oct.	3,589	6,304	121	10,014	9,530	25,499
Nov.	3,425	4,772	105	8,303	9,044	26,290
Dec.	3,087	4,452	112	7,650	8,804	27,540
1961						
Jan.	2,449	6,590	91	9,130	9,221	27,682
Feb.	2,191	4,722	92	7,004	8,591	29,338
Mar.	2,448	6,595	123	9,166	9,212	29,385
Apr.	2,934	7,202	96	10,232	8,882	28,033
May	3,377	7,716	99	11,192	9,604	26,503

Source: The Rubber Manufacturers Association, Inc.

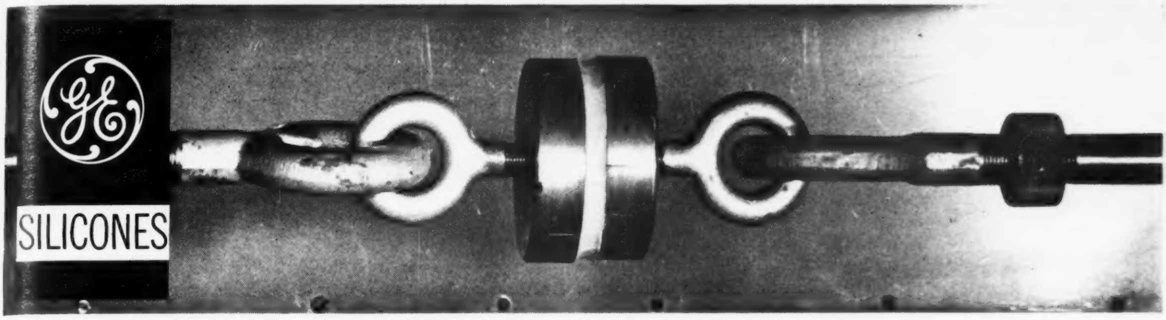
U. S. Rubber Industry Economic Indicators

	Production Index*				% Return†	
	Total Rubber and Plastics Products					
	Seasonally Adjusted, %		Without Seasonal Adjustment, %		On Sales	On Investment
Year	1947-49 100	1957 100	1947-49 100	1957 100	R&MP‡	R&MP
1960						
Sept.	194	111	196	112	3.3	6.8
Oct.	192	110	202	116		
Nov.	192	110	196	112		
Dec.	184	105	176	101	3.2	6.4
1961						
Jan.	180	103	189	108		
Feb.	178	102	188	108		
Mar.	168	96	176	108	2.9	5.2

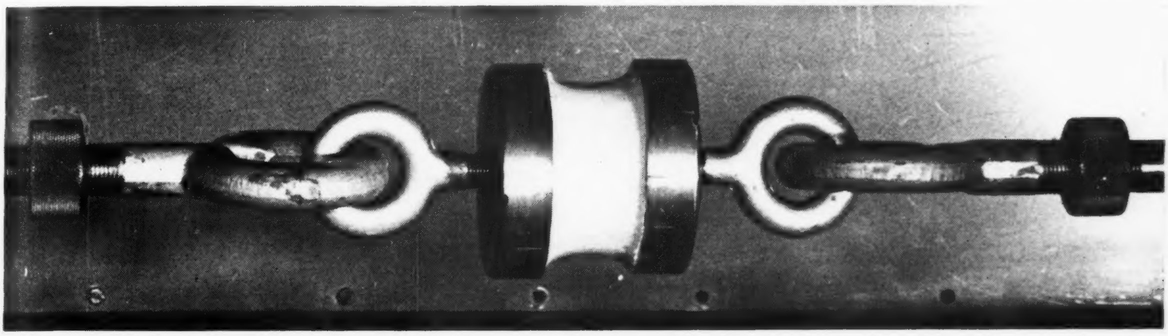
* F.R.B. Index of Industrial Production revised to include plastics products and change base period.

† Base Data F.I.C.-S.E.C.-Quarterly Financial Reports—% Calculated by RMA.

‡ R&MP = Rubber and Miscellaneous Plastics, a classification revised according to the 1959 Standard Industrial Classifications.



New General Electric silicone rubber bonds



to many metals without a primer - the bond is stronger than the rubber!

Here is the final proof of the bonding strength of General Electric's new self-bonding rubber. This high strength rubber was pulled apart at over 1500 psi, but the bond remains intact. The rubber never parted from the steel.

Cuts out half the steps in bonding process

Shown above is General Electric's new high strength self-bonding rubber in action: Without using a primer you can bond this rubber to steel and many other metals so well that the bond is stronger than the rubber itself! SE5504 is one of the strongest silicone rubbers available.

With new SE5504, you can now cut your bonding process in half, by eliminating these four steps: Grinding or sandblasting metal; detergent washing; primer application; oven cure for primer.

Now, you just: Wash metal with solvent; apply self-bonding SE5504; oven cure the rubber. That's all.

This new rubber virtually eliminates rejects due to poor bonding. You speed up production, increase profits, and provide a better product for your customers.

For all the details on new self-bonding SE5504, along with application data, write: General Electric Company, Silicone Products Dept., Section II845, Waterford, New York.

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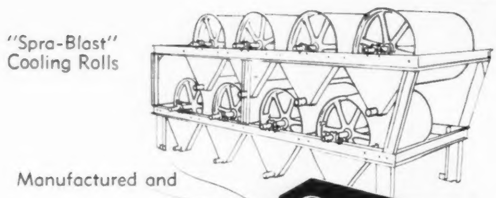
GENERAL ELECTRIC

MR/203 A



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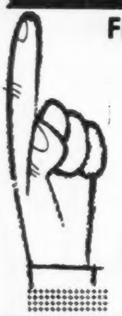

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BEVEL OR STRAIGHT EDGE
CUT PRECISION SOLES UP TO 1" THICK
WELLMAN CO., MEDFORD, MASS., U. S. A.

Natural Rubber Prices

REX CONTRACT

1961	June 16	June 23	June 30	July 7	July 14
July	29.75	29.90	29.30	29.25	29.30
Sept.	29.15	29.00	28.75	29.25	29.30
Nov.	29.05	28.65	28.60	28.85	29.20
1962					
Jan.	28.80	28.55	28.42	28.75	29.05

STANDARD CONTRACT

1961	June 16	June 23	June 30	July 7	July 14
July	29.55	29.50	29.20	29.15	—
Sept.	29.05	28.80	28.65	29.10	29.20
Nov.	28.95	28.45	28.50	28.70	29.10
1962					
Jan.	28.75	28.35	28.35	28.65	29.05
Mar.	28.65	28.35	28.35	28.60	28.90
May	28.60	28.35	28.25	28.55	28.85
July	28.60	28.30	28.25	28.55	28.85

NEW YORK OUTSIDE MARKET

	June 16	June 23	June 30	July 7	July 14
RSS #1	29.75	29.75	29.50	29.37	29.50
#2	29.50	29.50	29.25	29.13	29.25
#3	29.25	29.25	29.00	28.85	29.00
Pale Crepe					
#1 Thick	33.25	33.25	33.00	32.85	33.00
Thin	32.00	32.00	31.75	31.63	31.75
#3 Amber Blankets	25.75	26.00	25.75	25.63	26.25
Thin Brown Crepe	25.63	25.63	25.37	25.25	25.85
Standard Flat Bark	20.25	20.25	20.13	20.25	20.25

U. S. Rubber Industry Sales and Inventories

(Millions of Dollars)

	Values of Sales*				Manufacturers' Inventories*			
	1958	1959	1960	1961	1958	1959	1960	1961
Jan.	448	508	530	450	1.100	1.013	1,148	1,130
Feb.	413	490	540	460	1,087	1,032	1,140	1,130
Mar.	412	506	510	490	1.112	1.030	1,160	1,120
Apr.	429	543	530	480	1,047	1,015	1,190	1,130
May	428	524	550	500	1.020	995	1,180	1,140
June	445	520	520	...	986	1,013	1,200	...
July	478	519	480	...	980	1,075	1,230	...
Aug.	438	492	480	...	1,024	1,113	1,240	...
Sept.	464	544	510	...	1,024	1,114	1,210	...
Oct.	493	555	490	...	1,022	1,115	1,160	...
Nov.	472	482	550	...	1,018	1,120	1,140	...
Dec.	518	508	520	...	994	1,124	1,120	...
Total	5,438	6,191	6,210		12,414	12,759	14,118	...

* Adjusted for seasonal variation.
Source: Office of Business Economics, United States Department of Commerce.

New Publications

(*Continued from page 21*)

"Portable Mixers." Cleveland Mixer Co., Bedford, O. 12 pages. This brochure contains engineering data.

"Bulletin 8-16." Armour Industrial Chemical Co., Chicago 90, Ill. Protective-coating stripping formulation suggestions are offered.

"This is Research-Cotrell." Bulletin 500. Research-Cotrell, Inc., Bound Brook, N. J. 12 pages. Research and service facilities for air pollution are described.

"Acid-Proof Cement." Bulletin #1. Acid-Proof Cement Manufacturers Association, Philadelphia 7, Pa. 8 pages. This bulletin contains resistance charts.

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TITANOX titanium dioxide pigments add eye-catching beauty and sales appeal to a wide range of rubber and plastic products—including white and light-colored luggage that attracts admiring glances.

For many rubber and plastic products TITANOX-RA or TITANOX-RA-50 provide outstanding whiteness, brightness and opacity. Where weather resistance is of prime importance TITANOX-RA-NC may be preferred. Also new TITANOX-RA-40, rutile TiO_2, yields clean, bright whites and sharp tints at economically low loadings in many compositions. No matter which you choose, all TITANOX pigments have the ease of dispersion and uniformity that increase production efficiency.

For complete information on the type of pigment to meet your requirements, consult our Technical Service Department. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; offices and warehouses in principal cities. In Canada: Canadian Titanium Pigments, Ltd., Montreal. 7909

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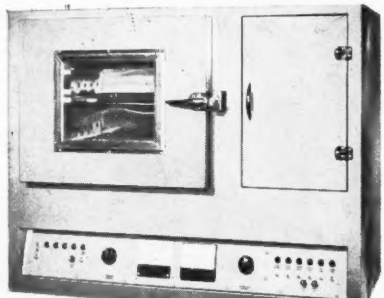
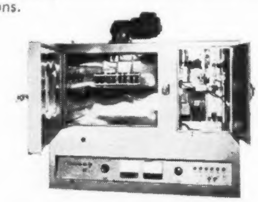
Goodrich Gulf Chemical Co.
Goodyear Tire & Rubber Co.
General Motors Corporation
Phelps Dodge Corporation
Phillips Chemical Co.
Texas U.S. Chemical Co.
TLARGI, U.S.C.
U. S. Rubber Company
Shell Chemical Corporation



Orec 0300 Series employ an *electronic-chemical loop feed back servo system to achieve and precisely maintain chamber ozone concentrations.



Orec 0300 with Dynemic Stretching Apparatus.
* patent pending

Write for illustrated brochure

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- AUTOMATIC CONTROL SYSTEMS
- RECORDING INSTRUMENTATION
- STRETCHING APPARATUS
- MEASUREMENT INSTRUMENTATION
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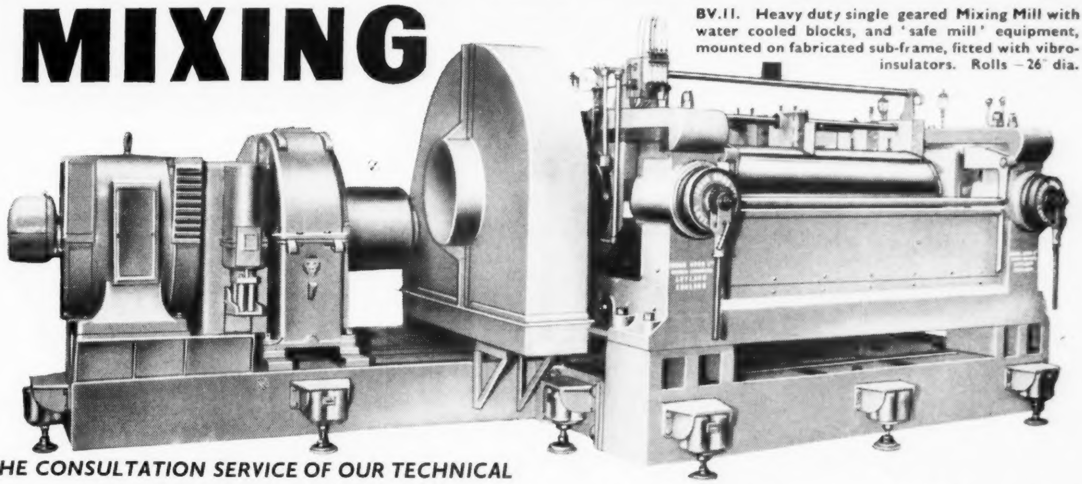

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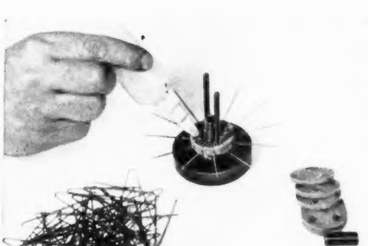
With Eastman 910 Adhesive...

Strong rubber-to-rubber bonds in 8 seconds

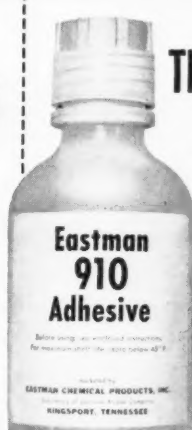


Ever see an electric rodding mouse? Chicago Pneumatic Tool Company makes one. It scampers through underground ducts pulling its tail (a cable puller) behind it at 150 ft. per minute. Rows of vibrating nickel-alloy tines held fast between rubber discs help drive the mouse along duct walls. Each disc is bonded to its neighbor in 8 seconds, with just two drops of Eastman 910 Adhesive, using only contact pressure. Bonds are stronger than the rubber itself! And no heat, no solvent, no catalyst are required for this quick, efficient bonding job.

Eastman 910 Adhesive will form bonds with almost any material. Send $5 for a trial kit and try it on *your* toughest job. Kits and further information are available from Armstrong Cork Company, Industrial Adhesives Division, Lancaster, Pa.; or from Eastman Chemical Products, Inc., subsidiary of Eastman Kodak Company, Chemicals Division, Kingsport, Tennessee.

Here are some of the bonds that can be made with Eastman 910 Adhesive

Among the stronger: *natural rubber, SBR, Buna N, most types of neoprene; vinyls, phenolics, cellulosics, polyesters, polyurethanes, nylon; most woods; steel, aluminum, brass, copper.* Among the weaker: *polystyrene, polyethylene,* and *fluoro-hydrocarbon plastics* (shear strengths up to 150 lbs./sq. in.).



There is no adhesive like Eastman 910 Adhesive

SETS FAST—Makes firm bonds in seconds to minutes.
VERSATILE—Joins virtually any combination of materials.
HIGH STRENGTH—Up to 5,000 lbs./sq. in. depending on the materials.
READY TO USE—No catalyst or mixing necessary.
CURES AT ROOM TEMPERATURE—No heat required to initiate or accelerate setting.
CONTACT PRESSURE SUFFICIENT.
LOW SHRINKAGE—Virtually no shrinkage on setting as neither solvent nor heat is used.
GOES FAR—One-pound package contains about 14,000 one-drop applications.
The use of Eastman 910 Adhesive is not suggested at temperatures above 175°F., or in the presence of extreme moisture for prolonged periods.

See Sweet's 1961 Product Design File 10d/Ea.

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Growth opportunity with a medium-size progressive eastern manufacturer of rubber belting and hose, who has an opening for an experienced, practical mechanical goods technical director. Strong in belting and mandrel-made hose, capable of developing new products completely from compounding and construction stages to factory processing and testing. Degree not mandatory. Submit detailed résumé to: Mercer Rubber Company, 136 Mercer Street, Trenton 90, New Jersey.

CHEMIST—B.S. IN CHEMISTRY OR TEXTILE CHEMISTRY, with experience in finishing and/or dyeing or printing of textiles. Position involves project work on wet finishing, printing, evaluation of chemicals, and similar assignments. Prefer a man with two years' experience, but will consider a recent graduate. Excellent opportunity. Write stating qualifications and salary requirements to Box No. 2628, care of RUBBER WORLD. Replies confidential.

RUBBER CHEMIST—LARGE SOUTHERN FIRM HAS AN IMMEDIATE opening for a man with a B.S. Degree in Chemistry and five to seven years' experience in the compounding of latices for adhesion to rubber. Position involves work with production, customer contacts, development of new treatment for textiles, and other similar assignments. Excellent opportunity. Write stating age, qualifications, and salary requirements to Box No. 2629, care of RUBBER WORLD. Replies confidential.

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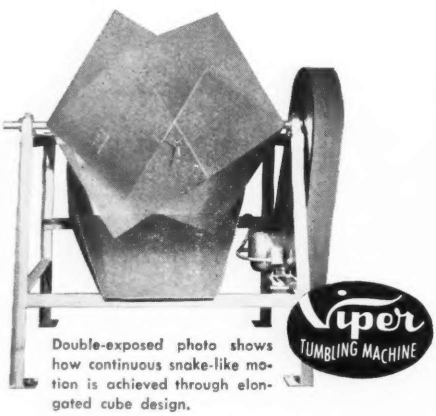

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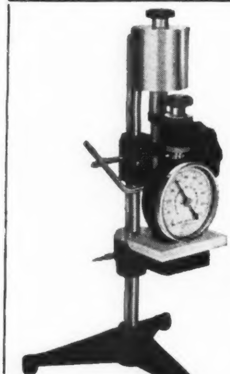

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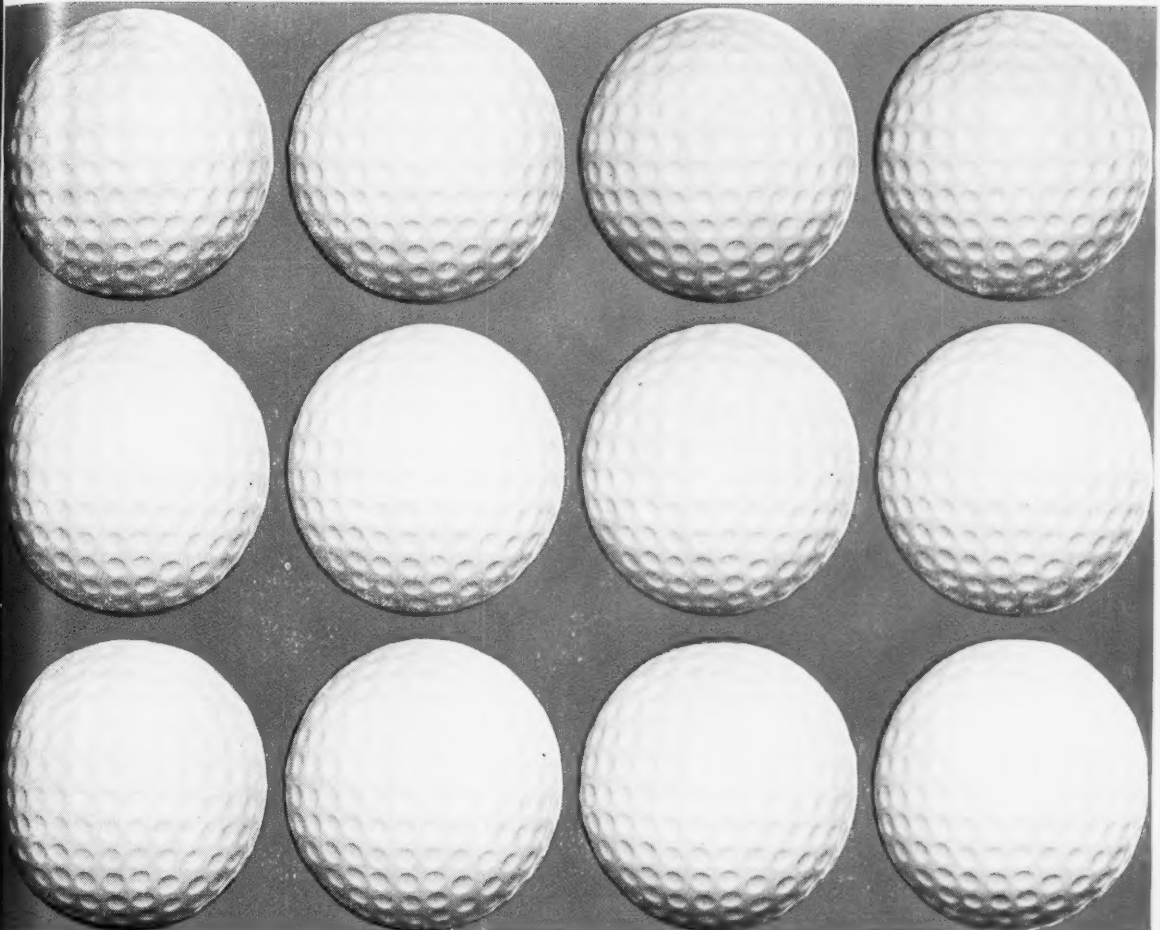

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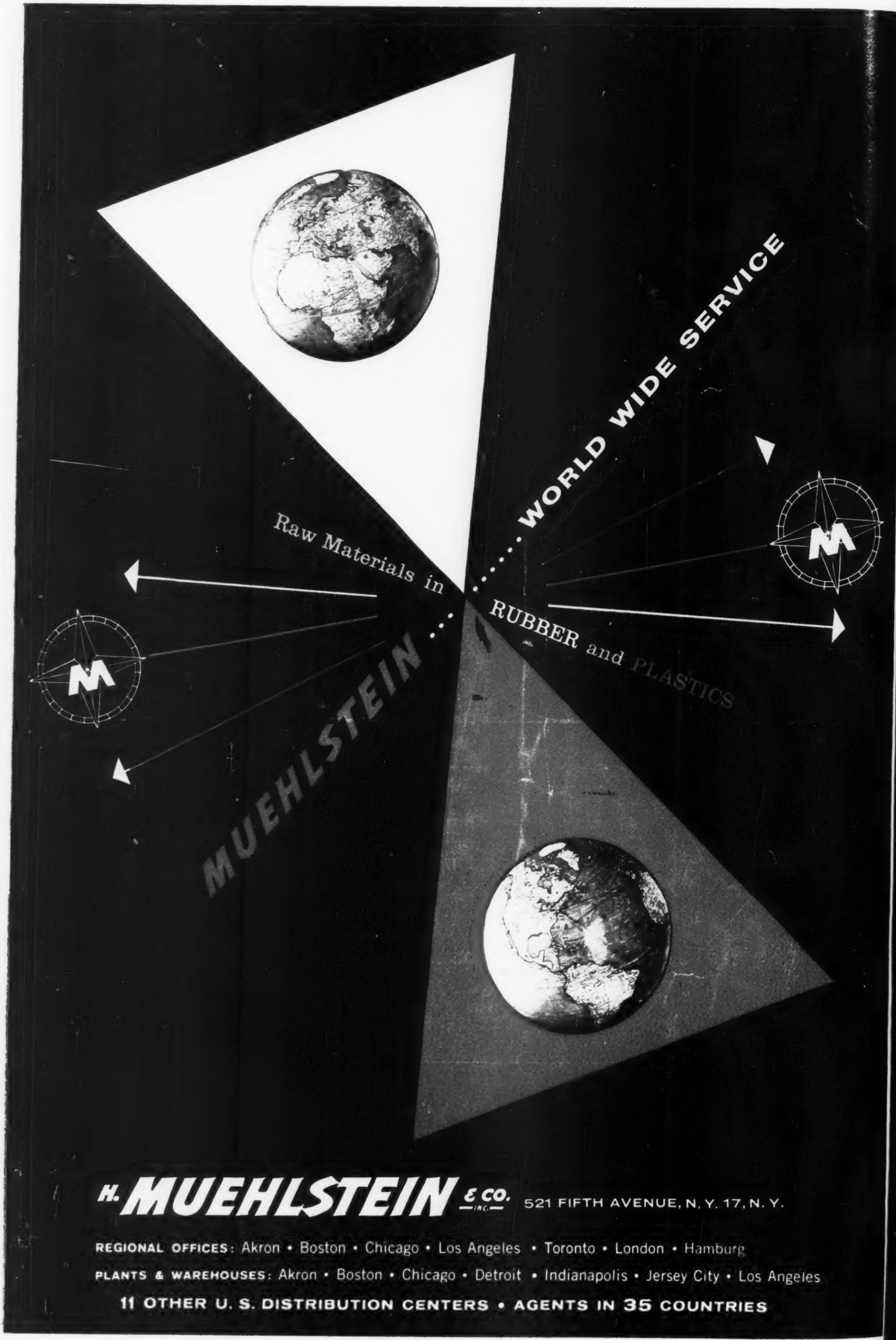
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